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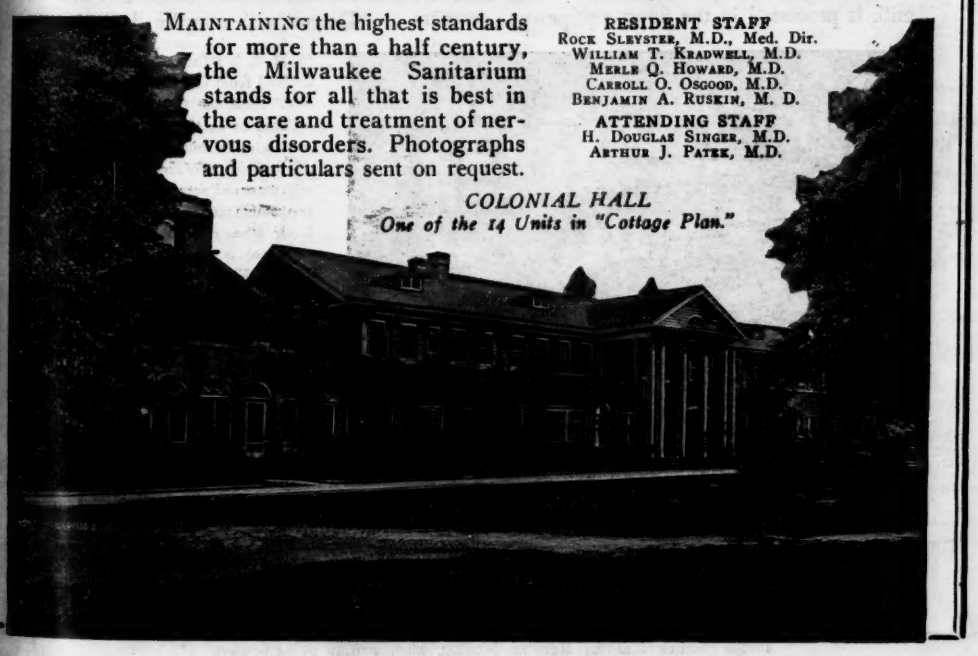

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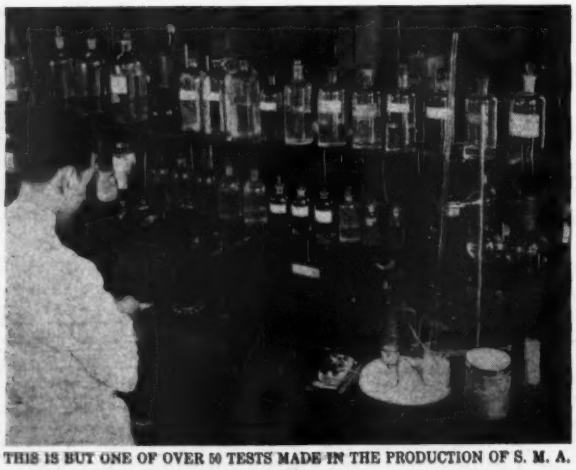

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ILLINOIS MEDICAL JOURNAL

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Editorials

CAUSES OPERATING TO THE DETRIMENT OF MEDICAL STABILITY

Legislation that advocates a bureaucracy to control and dominate the members of the medical profession to the extent that such bureaucracy determines the personnel of a physician's clientele and the fee he may charge regardless of the qualifications obtained and the specially skillful service rendered spells the beginning of the end of scientific medical service for the people.

It is just as unamerican for a bureaucracy to determine a medical clientele as it would be to determine the clientele of a butcher, a baker, or a candlestick maker. There is no difference in the application of the principle.

The physical welfare of our people was never so well taken care of as now. Preventive medicine has made tremendous progress and is the outgrowth of work accomplished by the organized medical profession.

Unfortunately the medical profession is confronted with numerous enemies without and a liberal sprinkling of traitors among its own ranks. A great number of men and women who have been bitten by that fatal parasite, the upliftus putrifaciens in the guise of uplifters, are seeking to eliminate the doctor by crushing his individuality, hampering initiative and hoping thereby to accomplish destructon of scientific medical progress, by attempting to divert the practice of medicine into untrained and incompetent hands, which will bring about, as it has done in other countries, the worst imaginable form of medical service.

The wolf at the doctor's door is about to catch by the throat the entire medical profession. Hidden under the cloak of State medicine, compulsory health insurance, national socialization of medicine and sundry other acknowledged offspring of radicalism and cheap politics, only a small percentage of physicians have guessed the evil for what it is.

Those doctors who are awake to the dangers

threatening the profession, realize that unless radical action is accomplished speedily, the doctor will find himself deprived of the privilege of continuing his present occupation.

In recent years the economic status of medicine has been practically turned inside out. *Figuratively speaking the physician has become a civic nonentity. Politicians have arrived at the state where with their business eye they regard a physician as "being in the world but not of it."* Neither politics nor "big business" has hesitated to take advantage of this condition. Considered an "easy mark" to begin with, these interests proceed to make us "the goat" and endeavor to classify us as the cheapest of cheap labor. For years the medical profession has furnished the most servile of hired men for corporations and the great insurance companies. Now the profession is in a fair way to serve them even more servilely as vassals of the state.

As we have repeatedly said in previous years in the columns of this journal three curses are operating to the detriment of the government stability at the present time, they are: autocracy, bureaucracy, and bolshevism. Not centralization of more power at Washington is wanted but decentralization of that now existing there would go a long way to help remedy existing social ills. The present trend towards centralization of power in this country is raising an army of politicians and bureaucrats all of whom must be supported by general taxation of the people.

As a result of increase of bureaucratic dictation Americans are today the most ruled and standardized people in the world, and we are building up armies of citizens to enforce all the laws; by and by we shall all be state and government employees, earning our pay by watching or spying on one another.

The tendency of the age is toward paternalism. Paternalism is doing for the man what he should do for himself. It is the continuation of childhood care for the adult. "Paternalism is the principle or practice of a government or governing bodies that undertakes to supply needs or regulate conduct of the governed in matters affecting them as individuals as well as in their relations with the state or governing bodies and to each other on the assumption that it can best determine and secure their highest welfare."

The shortsightedness is in the medical profession. The propaganda is seen creeping out in the advocacy of the wholesale treatment of the sick. The germ is in lay dictation as well as in corporation practice and likewise overcentralization of power in the hands of incompetent people who know nothing about medical problems.

Job work in medicine does not get the best results. This is illustrated in government work. The work is done neither as well or as economically as in private practice of business. The weak link in the chain in mass diagnosis and treatment of human ailments is the lack of personal responsibility.

DOCTOR, GO TO THE POLLS AND VOTE ON NOV. 3—TABOO PARTY POLITICS

The bulk of the doctor's woes are economic. Make your choice between the candidate who is wrong both economically and scientifically and the candidate who will right these wrongs. Change unbearable conditions.

Every physician in the State of Illinois must go to the polls and vote on Nov. 3, or else hold himself largely responsible for and absolutely devoid of a right to protest against economic conditions entailing little less than menacing servitude of the medical profession.

Even if a man fails to agree with all the tenets and policies of former President Coolidge, there can be no dissension from Mr. Coolidge's clearly expressed dogma that:

"Every voter ought not merely to vote, but to vote under the inspiration of a high purpose to serve the nation."

The voice of the ballot is almost as loud as the stentorian tones of that good old-fashioned medium, "Spot cash." For spot cash, or ready money, can purchase almost any of the necessities of life, and "necessities of live" savour of the great mirage in the homes of far too large a percentage of practicing physicians today. Either their practice is being taken out of their hands by lay institutions and endowed foundations practicing medicine or, if they have kept even a small remnant of practice, the patients are unable to pay. World-wide as is the depression today, sharp as is the pinch upon the purse of every citizen, the doctor's pocketbook began to get this squeeze acutely at least fifteen years

ago. Despite the danger that was pointed out in the columns of this periodical, despite the diagnosis that the trouble lay rooted in a socialistic infection spread by politics and political contacts, and that the one panacea lay in the ballot box, thousand of physicians disregarded the simple remedy for a raucous ill.

Again the Editor of this JOURNAL asks, aye, even entreats his brothers in medicine to stop, look and listen to where this trend is leading. Economists admit that we are passing through one of the greatest crises in the history of civilization. So far it has been kept chained within the limits of economics, but those who are weather wise are dreading the hour when, if unchecked, the debauch of degeneration shall send its lesions into the very heart of science and of culture. The footprints in the trail are already marked only too plainly in the fields of the fluid sciences of which medicine is at once the sacrifice and the sacrificer.

What every doctor should do and do without hesitation is to discover which men among the hundreds striving to be elected as government of the country are the men who stand for Americanism; who are patriots first and politicians afterwards.

This is the time, as never before, when elections demand not party politics but patriots of the people.

The United States of America founded its Constitution, owes its birth to the principles of liberty, as well as to community justice. It has become the habit with fine phrasers to substitute the word "communist" for "community" and "party" for "patriot."

When the doctors of this country get down to brass tacks and weigh in the balance whether it is better to spend a little thought on politics and less on protest, more on citizenship and less on complaint over spilled milk, the answer will be easy to dozens of problems confronting the doctors today.

Try it during the next fortnight. Find out who is running for office in your town, your county, your state, your country. Discover the attitude of these candidates towards these problems besetting humanity with which the physician must cope every day of his life. Decide upon the man who can best serve the purpose of the ideals of organized, scientific, self-sacrificing medicine, and let your ballot do the rest.

YOU MAY NOT BE INTERESTED IN POLITICS, BUT POLITICS IS INTERESTED IN YOU

In its management of public business politics grips every man's contact with society and with the government. Physicians cannot afford to ignore politics, for politics will not ignore them. The quality of politics depends upon the degree of public interest in it.

Party politics must go under the hammer and go now. Physicians of Illinois must make count their influence for requisite legislation through the results of the next election.

There is no time to waste, elections hang over our heads. November 3 is a day of destiny. The voice of the candidate is heard in the land. So the vote of the physician must be cast for those candidates who will lend an ear to the profession and its dependent, the public health and welfare.

Ballots talk. More effective than all other oratory is the count at the polls. Let the physicians of Illinois show that this gift of electoral eloquence is not denied them by making themselves heard at election day.

The times demand that patriotism supersede partisanship. What alliance each candidate for any office has made with the insidious red propaganda springing up stout as purslane all over the land, each and every doctor should discover without any delay and judge his voting accordingly.

Doctors who think that they can dodge the perhaps tedious, but admittedly necessary task of becoming interested to the point of personal exertion in the government of the United States are mistaken. The rule holds that a man must govern his house or be governed. Apathetic physicians who are willing to submit to the despotism of money-grabbing, wire-pulling politicians may find food for thought and spur to action on November 3 in this quotation:

"There is no escaping politics. It has a bearing on almost every human interest. A doctor may not be 'interested in politics,' but politics is interested in him. In its management of public business it grips every man's contact with society and with the government.

"It is impossible to be born or to die, to marry or to be divorced, without politics having to do with the matter. Every tax you pay, the smooth streets and the good roads, the public schools, the fire department, the health department, the water you drink, asylums, courts, custom houses, jails

and penitentiaries, the police, the post office, every law and ordinance—all spring from government, government springs from parties, and parties are in politics.

"The people can not afford to quit politics, for politics will not quit them. The quality of the politics depends upon the degree of the public's interest in it."

But the people can quit the parties and should quit any party whose candidate does not stand for the people's principles.

What better, plainer plea can be made the physician and at this crucial moment.

Remember election day, November 3.

As a guide to the voting physician let information be given on the following general principles, of interest equally to the medical profession and the general public.

We have too many laws, and too large a tax levy.

Living expense and taxes will be lowered as soon as hundreds of over-priced, interfering, recently adopted and unnecessary laws are done away with. America is mortally ill from a plague of laws and thousands of Bureaus trying to regiment all our industries as well as the life of the private individual. This evil is maintained at an annual cost per capta of $91, and of about $350 per family. One out of every five people in the United States who are over sixten years of age, and who are gainfully employed, is on the public payroll. In the last 70 years this ratio has risen from one out of every 1,000, and in the last 36 years from 1 of every 100.

There are 20 million employees on the public payroll according to the estimates of census statisticians. *This places an office-holder or "tax-consumer" on the backs of every two tax-producers.* Exclusive of pensioners there are millions of public servants whose pay comes from the ever increasing taxes. A large proportion of this number is engaged in the administration and execution of superfluous statutes.

A similar situation crushed France and produced the French revolution. It was the bane and damnation of Germany.

"Americans are now compelled by law to do, and prohibited by law from doing, more things than were the citizens of autocratic Europe before the war."

We are the victims of a paternalistic regime that will eventually enslave and bankrupt the country. The *cost* of *government* has become unbearable. Too many functions of local and of state governments are being controlled by hidden bureaus in Washington. *There is more power exercised today in these bureaus by unknown "experts," political appointees of whispering propaganda, than by the courts themselves.*

Centralization of government, bureaucracy, state subsidies and autocratic control are a poignant menace, and a fatal growth.

We have said repeatedly in the columns of the ILLINOIS MEDICAL JOURNAL over a period of a decade or more that:

Bureaucracy is a curse wherever inaugurated. In the management of medical affairs it is fatal. Germany stood at the pinnacle of medical achievement thirty-five years ago. Under bureaucratically administered state medicine, Germany has come to have the worst medical service in the world and the poorest care for the health of the people. It will be ruinous to the health and welfare of the United States if this system is adopted in this country.

Before the coming legislature and convening Congress there will be presented many bills, attempting to regulate incompetently the practice of medicine and needlessly to increase taxation. Many of these bills will provide for the licensing to practice medicine, of uneducated and improperly equipped men and women.

We ask no especial favors for doctors, but we believe in a single standard of education and a thorough professional training before a man or woman can be licensed to practice the healing art or to diagnose disease.

Persons who seek a license to treat human ailment in the State of Illinois should know how to make a diagnosis of disease which is essential for the conservation of the public health.

There should be no side door short cuts to the practice of the treatment of disease in this State.

Don't vote for any man unless you know his attitude towards medical legislation designed to increase taxes and to medical legislation intended to safeguard your health and that of your neighbors and fellow citizens.

"THE RIGHT TO VOTE IS MORE THAN A DUTY, IT IS A PRIVILEGE"

Where medicine is concerned, it begins to look as if the doctors must either vote for community

rights or else be sunk by communistic wrongs.

Again the job of voting confronts us at the election November 3.

Must the physicians of the land spend even more money, and more time, to discover that neither they nor their profession can compete with practical and practicing politicians? When will they learn the importance of paying more attention to election day—every man with an "M.D." at the end of his name who calmly sits back now and lets the country be run by those who are not "too busy to bother" with the ballot,

What economic self-preservation the medical profession has been able to achieve has not accrued from any devotion to citizenship duties, but because of the respect in which, even in this topsyturvy day, the average citizen, still holds the medical profession. Of course this same "Mr. Average Citizen" through endowed foundations is only too often trying to practice medicine himself—but even so.

If the doctors of Illinois would attend ever so slightly to their personal citizenship duties—which is a task involving their personal particpaton in all electons—the result would be a near-panacea for a multitude of civic ills, that are insidiously near to eating at the very core of the essence of civilization.

It is no longer a question of a man's "getting" or "not getting into politics." Medical men must cry "Checkmate" to politics. For the politicians of the country have already grabbed hold of the very tail of the medical profession, and are literally swinging this august body of men about with as little ceremony as if it were a yellow dog!

Blinking at facts is useless. The entire trend and achievements of legislation in the past twenty years show how medicine is made the pawn of politics. In another twenty years the medical profession will find itself throttled and altogether ham-strung unless it awakens speedily to the situation. Nor does "waking up" mean that any man can do this deed vicariously. The situation is up to the individual physicians of the land. Every doctor must get to the polling place.

Each doctor must doff his toga of science sufficiently long to discover what is going on before it goes so far as to give him and his profession, and par consequence, the public health and the virility of civilization—a knock-out blow. Just as soon as physicians enter the actual arena of politics and lend their professional support to those ethical lawyers and clergymen who are accomplishing a brave futility in the effort of getting politicians out of politics, there will be the requisite essential change in conditions for restabilizing foundations of the world's greatest democracy and even of civilization itself.

Well has it been said that the policies of one set of politicians are in force so long as "fifty and one-tenth per cent. of the votes are cast for those politicians, and the opposite policies are in force when one voter in a thousand changes his mind. It is on such extremely slight changes as these that often hangs success in any political field."

Even now, hobbled by the almost ubiquitous lethargy with which the average physician regards elections, candidates and the entire system of democratic government—physicians have far more influence than they suspect with members of law-making bodies.

Wide knowledge, good judgment, public spirit and the gift of vision are sine quo non with every successful man of medicine. Physicians everywhere should realize the imminent necessity for their stating to the public as well as to law-makers, not only the ideals of the profession, but the arguments for adoption of these ideals and their absolute bearing upon the health and the wealth of every country. This setting forth of principles should, if indicated, be also a going forth to war for the right—a defense of medical ideals and of the country itself.

Everybody, everywhere may not agree with some of the ideas and dicta of ex-President Coolidge. But every sane minded individual, *anywhere,* must coincide with these assertions of the nation's chief executive:

"Many of the founders of our government gave all their wealth and their lives for the right of franchise.

"The right of franchise is the right to vote.

"It is the most valuable heritage the American people have.

"The right to vote is more than a privilege.

"It is a duty.

"Our government will continue to give us the

opportunity for independence and freedom only if we do our duty towards the government.

"Our duty is to go to the polls and vote intelligently.

"It is our duty to see that each member of our family, who is qualified, votes.

"It is our duty to know the records of the candidates.

"To some of them you will entrust your liberty and the protection of your property."

Again are the physicians of the country besought to take heed of the electoral situation.

BEFORE ELECTION DON'T FAIL TO CONTACT CANDIDATES FOR OFFICE BOTH LOCAL AND NATIONAL

Does anybody with even a modicum of knowledge of the average American physicians' character believe they can be cut and squared to the Soviet pattern?

What are the politicians going to do about it? What are they trying to do? It is positively apparent that no small factor in the physician's retaining his independent status will be his active interest in civic affairs. Public welfare demands this his voice be heard. Without further delay interview the candidates for office along the following lines:

"Is the man who is asking for your vote in favor of government medicine, government ownership, government banking, government meddling, government regimentation under a bureaucracy, or for a minimum of government in business, with individual opportunity and freedom from tyrannical rule by government departments and bureaus? Is he for confiscation by taxation, redistribution by demagogues, or for an opportunity for everybody and anybody to accumulate honestly and without special privilege, to work for themselves as well as for the politician and the taxgatherer? Is he for free speech and free criticism of public officials whose acts, in his opinion, call for criticism? These questions are American, not partisan. They must be considered and decided by Democrats and Republicans alike."

Liberty is not worth much if it does not insure economic liberty. Slaves once toiled and died under the flag of freedom; black slaves. Today their place, under the same flag, can be taken by the economic slave.

What will it profit the politicians at Washington who are juggling the destiny of the medical profession and the American people into regimentation and make of us all mere pawns of national government dictation?

Doctors of America, when medicine is involved, are not Republicans or Democrats. They are first doctors with full knowledge of what service to sick people means. They have complete knowledge of what the needs are; they have given much thought and study to the subject of State Medicine. They are thoroughly familiar with what has happened in many countries in Europe where various systems of state medicine have been in operation for years and have finally failed.

Let every doctor in Illinois be represented in public thinking. See the candidates in your district now. That you make contact with candidates and express your opinions on medical problems is of the greatest importance.

It is your obligation to yourself, your profession and the public at large to find out how each candidate stands on issues of great importance to the medical profession as well as to the public welfare.

DOCTORS, DENTISTS AND DRUGGISTS A FORMIDABLE POLITICAL POWER

There are in round numbers 170,000 physicians, 50,000 dentists and 60,000 drug stores in the United States. In the latter instance there are approximately three druggists for every drug store, making a total of 180,000 druggists. These professions, if properly organized and directed and working cohesively, can be made the greatest factor for good in the country. No legislation inimical to the best interests of the public and the professions named could be placed on the statute books with this organization working coherently. Not a home in the State or Nation that is not reached by some Doctor during the course of the year; perhaps not an individual in the Nation who is not met face to face and engaged in personal conversation by one of the three professions in a given twelve months.

What a power if organized would be the doctors, dentists and druggists of the United States in combating medicinizing socialization schemes, regimentation of the profession, government dictation and practice of medicine, government in

every kind of business and profession, schemes for health centers, clinics, compensation laws, health insurance, Sheppard-Towner Maternity Acts and in heading off Federal interference in medical practice by such menaces as the regrettable maternity bill and the other fifty-seven varieties of attempts to bring about State Medicine.

ACUTE MESENTERIC ADENITIS

Charles Stanley White and J. Lloyd Collins, Washington, D. C (Journal A. M. A., Sept. 26, 1936), state that they had sixteen cases of acute mesenteric adenitis. There seems to be a seasonal periodicity in their appearance, not unlike an epidemic of a communicable disease. The physical examination shows a slightly distended, tympanic abdomen, generally tender and resistant to pressure. While tenderness is marked in the lower right quadrant it is also present in the lower left quadrant. Examination of the throat and chest has been uniformly negative for gross pathologic changes. The blood counts have shown for the most part moderate leukocytosis (from 8,000 to 14,000) but a high percentage of polymorphonuclear neutrophils (from 80 to 95 per cent). The urine shows neither pus cells nor albumin. With such a history of an illness of forty-eight hours or less in duration, scarcely any other diagnosis than acute appendicitis can be entertained, and the patient forthwith is admitted to a hospital and the appendix is removed without delay. With present knowledge of the fulminative nature of appendicitis, especially in children, any other treatment than surgical seems illogical. At the operation the appendix appears in the rôle of the innocent bystander. There is something decidedly unsatisfying in that (1) the diagnosis was inaccurate, (2) it is very possible the patient would have recovered without operation, (3) the pathologic condition remains unexplained and (4) the error in diagnosis in all probability will be repeated, as no differential diagnosis can be established with the present inadequate data.

PERMANENCE OF CURE FOLLOWING RUPTURED DUODENAL ULCER

Donald Guthrie, Sayre, Pa., and Robert F. Sharer, Chicago (Journal A. M. A., Sept. 26, 1936) state that acute perforated duodenal ulcer is of rare occurrence. The importance of a correct diagnosis and immediate surgical management are stressed, because in no other acute abdominal emergency is the time factor of greater importance. Postmortem examination, which was carried out in every operative case that ended in death, gave no indication that primary gastro-enterostomy or a partial gastrectomy would have made a reduction in the operative mortality. Drainage of the abdomen increases the hazard of bowel obstruction and may well be omitted in the majority of cases less than eight hours old. In this group of patients with simple closure who did not develop obstruction, over 95 per cent of those followed remained well, the perforation perhaps destroying the ulcer site to a degree approaching that of the cautery. Delayed gastro-enterostomy may be safely performed on those developing obstruction, the great majority remaining symptom free. From a review of the complete autopsies and a nearly complete follow up in this long term series of cases, it would appear that simple closure should be the procedure of choice in the majority of perforated duodenal ulcers.

PHYSIOLOGIC EFFECTS OF CORRECTION OF FAULTY POSTURE

Louis B. Laplace and Jesse T. Nicholson, Philadelphia (Journal A. M. A., Sept. 26, 1936), state that twenty-six subjects having postural defects of the kypholordotic type were studied with respect to the physiologic changes produced by the correction of their faulty posture. The immediate effects were in general entirely comparable to those observed after one year of corrective exercises. In the corrected posture the diaphragm was not always relatively elevated as is generally believed, nor was the heart always more transversely placed. The diaphragmatic excursions were either increased or decreased, for reasons that are discussed. The vital capacity was generally increased, although flexibility of posture was requisite for optimum results. Oxygen consumption was variable. Pulmonary ventilation was generally increased. Circulatory efficiency, as judged by constancy of blood pressure and pulse rate, was generally improved; in two cases the correction of posture was able to prevent hypostatic congestion and syncope. It was concluded that the results of correcting faulty posture differ widely between individuals, irrespective of the grade of the defect. A correct posture appears to be an appreciable advantage to circulatory and respiratory function in the majority of persons, but in some a postural defect may be a compensatory mechanism which it is inadvisable to disturb. The therapeutic application of postural correction should be made according to the requirements of the individual case and only after an attempt to determine in what posture the individual is functionally most efficient.

SLOW CARBON MONOXIDE ASPHYXIATION: NEGLECTED CLINICAL PROBLEM

Harvey G. Beck, Baltimore (Journal A. M. A., Sept. 26, 1936), reports on a series of carefully studied cases of slow carbon monoxide asphyxiation. The symptoms exhibited have been correlated with the pathologic lesions produced in experimental animals and found at autopsy. The results establish the fact that slow carbon monoxide asphyxiation (anoxemia) produces a definite clinicopathologic entity despite views held to the contrary. The symptoms arise predominantly from organs rich in blood supply, thus demanding much oxygen, such as the central nervous system and the heart muscles. Owing to doubt and uncertainty as to the actual existence of the malady and a scant literature on the subject, the condition is not generally recognized by the profession and its importance has been underestimated. Since there is no medicinal remedy when the organic changes have once developed, treatment must be directed toward its prevention by proper public health measures.

MEDICAL ECONOMICS

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The impending national and state elections make repetition of previous articles, on the importance of the medical profession showing their interest and influence in the election, permissible. By this we do not mean partisan politics, but rather evidence of our interest in the good of the United States and the future of the profession to which we have dedicated our lives, the medical profession. We can do this in two ways: First, by studying the stand of both the candidates and the parties on the chief problems of the nation as well as the medical profession. A true understanding of their position is difficult in these days when so much is promised and so little performed. We cannot always get a frank statement from the candidates, but usually a little effort and study of promises and performances will tell us how much faith can be given to promises. The other method is to talk with the candidates for office and let them have the opportunity to know what we want as well as to tell us what they purpose to do. This will take a little time, but the influence it will have on the candidates, who after all is said and done are politicians and know that the way to keep in office is to pay attention to the desires of their constituents. This is the last time that you will be requested to take an interest in politics this year, for by the time the next article is in print the election will be over and the opportunity will be lost until the next election.

The lull in the reform propaganda resulting from the nearness of the election should not fool any thinking person. It is just a breathing spell and the time is not being lost by the reformers. They are hard at work with their planning and in the event that the present administration is returned to power, will be ready to start the propaganda mill. The State of New York Medical Society is thoroughly alert to this condition and are ready to oppose the same with publicity favorable to the present method of practicing medicine and opposed to any socialization by either state or national governments. This is an alertness and condition of preparedness, which the remainder of the state medical societies may well envy.

The Committee on Medical Economics of the Illinois State Medical Society held a special meeting at the Palmer House in Chicago on September 13 to talk over the problems in Illinois and to outline plans for the coming year. While there was no new problem presented, which was considered of outstanding importance, many of the current problems left from previous years were talked over and definite progress made as to the method to be used in meeting them. Each member of the Committee was assigned a special subject for study, and instructed to be ready to report at the next meeting of the Committee to be held prior to the first of the year.

The subject of Contract Practice received special attention. It was agreed that it was difficult to define the same and to know when contract practice was ethical and when it was not. As this was a subject to which Dr. Reed has given a great amount of time and study, he was requested to prepare a paper on the subject with especial attention to the fundamental aspects of the same and definition of the controversial questions. He has prepared the same and it will be published immediately following this article in the Column. We trust that all of you will read the same and whether you agree with the essayist or not, give some thought to the importance of this subject. So common has Contract practice become that practically all of us are doing some of it in one or more of its various forms. That it is of paramount importance is admitted and it is inevitable that it must be solved by the medical profession in the near future. The proper solution is as much your responsibility and duty as it is that of any man on this committee.

E. S. HAMILTON,
Chairman of
Committee on Medical Economics.

CONTRACT PRACTICE

CHARLES B. REED, M. D.
CHICAGO

The forerunners of the present forms of contract practice appeared in the last half of the 19th century about the time general expansion of scientific knowledge began but were in no way related to this new movement. The inception of this medical adventure is important as a background but the choice of this topic for presentation here was determined largely by its significant growth and by the wide epidemic of approbation which the practice has achieved as well as the scarcity of literature concerning it. Moreover the subject has many complexities and the greater the amount of thought and intelligence which can be directed to it the better it will be understood. In this paper only a brief history of the movement and some discussion of the principles involved will be attempted.

An early variety of this more or less casual innovation was the Mutual Benevolent Hospital Association which was philanthropic in character, liberally endowed and staffed by high class physicians. The avowed purpose of the corporation was to provide its members with medical care at low cost. The idea evolved out of humane sentiments with no conception of an ultimate commercial expansion to a degree where memberships are sold for the benefit of the promoter.

Another kind was developed by railroad, mining and lumbering companies for their workmen who were so far removed from settled districts that no doctor was available for emergencies. The situation was critical in extreme and the companies felt obliged to furnish first aid, primarily because none other was obtainable and next to avoid, or at least minimize, the legal liability for neglect of medical attention as well as to reduce the loss of working hours through accident or disease. Complete medical supervision soon followed and associated with it an attempt was made to determine the health of the worker at time of employment, the existence of occupational incapacity and the sanitary conditions of the working plant.

Out of this small beginning has grown the workman's compensation legislation, divers organizations like the Life Extension Institute, the vast business and charlatanry of occupational disease, over 750 contract enterprises and the recent strong thrust of the Social Theorists toward sickness insurance.

No discussion can be useful without an understanding of the terminology and The Judicial Council has clarified the issue here in declaring that "By the term 'contract practice,' as applied to medicine, is meant the carrying out of an agreement between a physician or group of physicians as principals or agents and a corporation, organization or individual, to furnish partial or full medical services to a group or class of persons for a definite sum, or for a fixed rate per capita."

This definition is broad and comprehensive. It covers a wide diversity of conditions but in it, notably, no reference is made to the ethics of the practice since there are industrial conditions wherein employers are required by law to provide medical care for their workmen, as well as communities which are not large enough to support a competent physician. These differences are too great to be unimportant and too pervasive to be overlooked. Hence before a conclusion can be arrived at on the ethics of such an agreement, the form and terms of the contract must be known as well as the circumstances under which it was drawn up. Even so it is not surprising to find much confusion in opinions for the data are so dissimilar and so personal that coordination of judgment is hardly possible.

Some further definitions may be desirable to elucidate subsequent remarks, thus,

1. *Practice* is the regular pursuit of a profession, such as the habitual application of medical knowledge.
2. *Solicitation* is an invitation for professional patronage by oral, written or printed communications, either directly or by an agent.
3. *Patient* is a person undergoing treatment for an illness, aberration or injury. This last definition may serve to recall an ancient phenomenon of which only vestiges remain at present.

Types of contract and of services rendered will depend in most instances to a large degree upon the honesty and high-mindedness of the men who devise and carry on the project and these qualifications in turn are influenced by the motives which bring the scheme into existence as well as the conditions associated with its execution.

Contract coverage will include on the one hand,

a. Injuries connected with employment.
b. Injuries and disease connected with employment.
c. Injuries and disease not connected with employment.

On the other hand will be found organizations or groups which engage in contract practice, among which are:

a. Large corporations which operate railroads, mines, oil wells, canneries, manufacturing concerns, lumbering and shipbuilding companies and similar industries.
b. Mutual benefit associations.
c. Hospitals and hospital associations.
d. Medical groups, or individual physicians.
e. County medical societies.
f. Trade unions and lodges.

To gain a just appraisal of these several bodies it is necessary to consider briefly the methods whereby some of the principal ones conduct their work. Many large corporations not only employ their own medical men but erect and manage their own hospitals on a more or less elaborate scale. A chief physician is in charge with an adequate salary while the supporting staff usually receives only minimal compensation. The members of the staff may be on whole or part time, or a fee-for-service agreement. The employees are cared for on a monthly payroll deduction basis and to this fund the companies often contribute.

Some Mutual Benefit Associations also follow this plan and maintain a low rate for members only. Yet notwithstanding conditions which largely favor these associations the income from members on low monthly rates is so small that only by endowments from friendly flesh pots and the profits from hospital care to the general public at regular prices are the institutions kept out of bankruptcy.

The so-called Hospital Associations are not appropriately named for as a rule they consist merely of business offices for the persons or firms that have contracts to sell. The contract being obtained the management may even go further and prescribe to physicians the extent of their services in given cases and the compensation to be expected. Such management constitutes the practice of medicine through an intermediary and is distinctly unethical.

In some instances medical combinations of excellent character are doing contract practice under specious names like clinics, bureaus, centers, leagues, etc., and while the service is better probably than that of most hospital associations yet some of these groups loudly assert that they are much dissatisfied with this kind of activity. Their statements may of course be true yet they not only continue their routine work but solicit more. Both experience and theory have shown that nothing is so futile in the absence of restraint as to expect a fixed and unflagging idealism from persons who have something valuable to sell and who would gain something desirable by selling it.

An extraordinary number of these experimental devices have been pushed out here and there since the depression in the hope and expectation of finding an outlet for ethical or, in some cases, non-ethical expansion. Laymen, Social Theorists, and professional altruists also hover about, alert and eager to elbow in and exploit the medical profession to their own ambitious advantage in finance and politics.

In order to meet the growing competition of contract practice a few County Medical Societies, in the state of Washington for instance, have contrived plans to take on contracts as organized bodies. Their purpose primarily was to give the people with low incomes the medical care which their members furnished to regular fee patients but at smaller cost. If incorporated, such societies are themselves violating the legal conditions of medical practice.

To carry out the program ethically the medical societies aimed to eliminate unfair competition among their colleagues and offer free choice of physicians. The execution of the project was found to be extremely difficult and usually unsuccessful. In the first place a business manager, or solicitor was absolutely necessary to carry out the multiple details of operation and secondly it was found impossible for one reason or another to enlist the entire county membership.

Hospitals have had much the same experience and the same drawbacks both ethically and financially. In all the attempts to meet the necessities of low income applicants financial obstacles immediately arose which could not disturb the groups that limited their activities to the payroll class. The prices frequently quoted in these

adventures range from $1.35 to $2.50 per month for each subscriber and it must be obvious to any medical man that only the scantiest first aid for minor afflictions could be properly rendered for so paltry a tax. To provide adequate attention at such low cost would result in swift bankruptcy for any conscientious practitioner, or fraternity.

The Mutual Benefit Associations and trade unions have not adventured broadly into contract practice. For the most part they have confined their interest and efforts to the narrower field of protection for the income of their members, which consists usually in employing a physician on a moderate salary to assume the medical responsibility.

The manner of operation and quality of service rendered vary greatly according to the plan selected. Throughout the entire membership of contract bodies a definite fear exists, and justly, lest the medical societies object to, or interfere with their peculiar professional activities. Likewise, there is a craftiness in business dealings and a circumvention of accepted ethics in many contract plans.

"Contract practice per se," says the Judicial Council "is not unethical," and as long as such methods were confined to the field of actual necessity, it created little or no alarm. But, as the exigencies of pioneer projects passed, the emergency skeletons and rules of medical care were not discarded but retained, to become the basis of new and vital schemes to compete with regularly established medical usage. Workmen's compensation laws were passed and funds became available to pay for the medical care of the injured employee. These funds, which assured the payment of fees for hundreds of thousands of potential patients excited the ardor and avidity of the conniving contract cliques. At this point a custom was introduced in contract enterprises by medical men similar to high pressure selling in commercial affairs.

In the medical profession, no ethical person advertises but he who first invokes the aid of publicity, although he becomes unethical and thereby a quack, wins interest and attention at once with very little expenditure. Certain types of contract projects would not be successful if physicians were obliged to wait until business and industry sought them out for their particular utility. Therefore a course of advertising was adopted to carry the message, at first to organizations having a large number of employees, later to small industries, laundries, garages, business houses, apartment houses and even to individual citizens. The business executive, manager, capper, adjuster, or solicitor thus became the publicity agent of the contract physician, or group. With the incorporation of this element into contract procedures, pressure of getting business became greater, new groups or associations were tempted by the profit motive to enter the contract field, and a definitely unfair competition with private medical practice was created. It was then a short and easy step to underbidding and misrepresentation to get contracts and with these unfortunate changes the operations became flagrantly unethical.

The workmen's compensation legislation has been almost an invariable precursor of general sickness insurance. First in succession comes the attention to occupational disease and then general health insurance and unemployment pensions. In the health insurance systems the free choice of physician is limited, professional confidence is not respected, lay interference and control is a constant menace, inadequacy of fees is habitual and the charges of undue influence on professional testimony by employers or insurance companies on the one hand and by malingerers on the other, are common.

The efficiency of the contract system is also open to question although it is claimed stoutly that the quality of service furnished by these groups is as good as any that can be had. There is much evidence however to show that this is not always true. For instance a leg might be amputated to avoid the expense of a protracted stay in the cooperating hospital while trying to save it. Again patients are sometimes treated at long distance by telephone so frequently that they prefer to pay the family doctor to manage a serious illness, or to operate, rather than the contract representative.

The charge has been made too that some contract doctors give as little attention as possible to their panel patients lest by treating them well they would be encouraged to demand an excessive number of treatments, calls or medicines. In the West Virginia coal field there has been much complaint because the privately owned, profit motive hospitals would habitually provide the least care that would give barely

acceptable results. In other words, the sense of personal responsibility is wholly lost.

Many objections to the contract system come to mind. Some are due to unethical performance and others to dishonesty in operation, restriction in service, or the inefficiency just referred to. Solicitation is almost inevitable in all types of this work and whether it be done by doctors or laymen, it is distinctly unethical.

Exploitation of the medical aid fund by contract doctors for personal profit occasionally happens to the great detriment of the patient and it results usually in a swift breakdown in the financial policy of the organization and in public faith. Workers in industries are convenient groups to inveigle or coerce into wildcat health insurance schemes. For 75 cents to $2.50 a month, contract doctors agree to render all professional services and care for all sickness with certain limiting safeguards. Such low compensation not only puts a premium on slovenly work but in many cases the—

1. Contract doctor is the insurer.
2. He is not supervised either in his financial resources nor in his execution of contract.
3. He may, or may not maintain a financial reserve.
4. He determines the rate, administers the fund, decides what services shall be rendered and performs them himself or through assistants and retains the unexpended portion of the income. Could any set of circumstances be imagined which would offer more temptations and more security for their gratification to an avaricious management?

Any insurance actuary will testify that the published rates of all these promoters are miserably inadequate for high class service and an unprejudiced physician will give frequent instances of failure of the insurer to fulfill his contract.

The contract itself is not always clear in its coverage and exemptions. Under pressure of competition the solicitor may have misrepresented the facts and the patient suffers from the fraud when he applies for treatment. He is therefore driven by necessity to the family doctor. Moreover most contracts cover industrial workers only. It is claimed that inclusion of persons not on the payroll, or of families, requires too much bookkeeping. Women are protected only if they are on the payroll and children never, so that the projects are highly selective from a financial standpoint. Again contract practice is concerned essentially with curative medicine and if a person wishes to keep well by periodic examination he must consult the family doctor, or pay additionally the contract group. Preventive medicine is no part of contract practice. In fact it is wholly disregarded.

Where a doctor or layman, group or corporation contracts to furnish either *hospitalization* or medical care or both for definite periods of time at an agreed rate the contractor is either practicing medicine unethically on the one hand in his own person or he is not practicing but acting as an intermediary between the real practitioner and his patient which is also indefensible and since for success in all these forms of activity a business solicitor is a necessity, the entire system is unethical. The process from its inception is directly contrary to Secs. 2 and 4 Art. VI of the Code. Either it reduces the compensation below the point of adequate service and to an unfair competition with other medical men or it puts the medical service under lay control. This exposes the doctor to the danger of discipline and expulsion from his county society which would deprive both him and his employers of protective insurance and of professional aid in damage cases.

Free choice of physician is often stresssed but these plans do not include all the physicians in a community. The so-called free choice is usually limited to the contract holders or their approved associates.

If a man is indisposed to wait for the gradual growth of a practice through his competency or as more often happens he discovers in himself an aversion to impecunious idols, or an avaricious temperament he will find an immediate appeal in contract practice. The effect of such a coalition upon the doctor himself must also be considered. The practice of medicine has always been a peculiarly personal pursuit. It belongs normally to the realm of private initiative and enterprise where competition rather than cooperation is the spur to effort. In consequence when a man enters into contract engagements his whole attitude toward his work is changed. He is bound by the economics of business and his relation to his colleagues and to his patients is conditioned by the new set of rules which his

new obligations require. His personal responsibility for instance is divided among his fellows. Moreover he will see many people daily with definite assurance of pay and therefore cannot have the same feeling toward his patients as the man who depends upon them for good will and support. The doctor has lost the ligament and articulation which should exist between him and his conferee; he has lost the human element. In place of the old intimacy which inspired the patient with confidence the doctor has submerged his professional identity in an organization primarily commercial; a corporation devoted to mechanical methods which in many cases has neither a conscience to guide, a body to kick nor a soul to save.

The public also feels the difference keenly. Contract practice creates a false impression of physicians and of medical service. Not only the financial but the professional relationship is disturbed. The patient and his friends are repelled by the cold impersonality, long distance control, and the cash-in-advance payments which are required. Contract proponents advocate a new high powered variety of medical service characterized by mass production methods and cross cut procedures which benefit the physician, the promoter, or the group rather than the patient, and on account of this pernicious practice of marketing medical service, the loyalty of the patient is destroyed—not only in one doctor but in all medical men and in medicine itself.

The prices charged for contract work imply that other medical fees are unreasonably high but the comparison is not fair since the contract system is an incomplete coverage. If it were not for the advantageous exemptions, the evasion of responsibility and the almost 100 per cent. collection guarantee, the holders of contracts would break down quickly under the economic impracticability.

Contract rates and fixed fees, openly advertised, imply that physicians have a sliding scale of prices. Medical and surgical treatments are indefinite scientific services measured in nature and amount by the necessities of the patient and cannot be compared to commodities sold by units of measure and weight and should not be a matter of bargaining. Moreover the various advertising concerns and institutions which solicit business on a fixed fee for each item of service increase the compensation extravagantly by demanding services which are not indicated or even superfluous in the management of the disorder.

After all this exploratory discussion the question naturally arises as to what would constitute, in principle, at least, an ethical contract? An answer to this question is difficult since, as stated previously, contracts differ so widely in form and in the circumstances which they were designed to meet. On the other hand however the stigmata of ethical failure are simple, comprehensive and complete. So simple that it is easy to determine whether a contract is unfair when one or more of the signs is present. Thus, as the Judicial Council explains, Sec. 2 Art. VI of the ethical Code is violated,—

1. Where the compensation received is inadequate as compared with the usual fees paid for similar service in the same community.
2. When the compensation is so low or the conditions of employment so inferior that competent service is impossible of rendition.
3. When physicians secure the contract by underbidding.
4. When, to a reasonable degree, the free choice of physicians is denied to patients who reside in a community where other competent doctors are available. This condition also violates the eighth of the ten principles adopted at Cleveland.
5. When there is direct or indirect solicitation of patients. This is also a violation of Sec. 4, Art. 1, of the Code.
6. Any provision or practical result which is contrary to sound public policy—and
7. Where an intermediary is employed who exploits the doctor.

It must be obvious that the application of these principles to a given case would provide ample machinery for differentiating the ethical from the unethical and the professional from the commercial forms of practice.

The fierce competition for contracts "acquisitions" as they are called, under the contract system has put the heaviest strain on the moral stamina of the doctor. Underbidding for contracts is only too common and when the successful bidder realizes that the financial returns are inadequate to meet the demands of first class work his technic tends to become slovenly.

Organized medicine has no desire to obstruct reasonable and honest efforts to provide the best possible care to all persons whether in the high, or low, income class but the welfare of the patient must always be the first consideration. Contract practice however is so closely allied to purely commercial enterprises that it is difficult

to maintain satisfactory professional standards and in consequence poor service is almost inevitable and for this reason in particular the whole problem has been looked upon with suspicion and dislike by state and national societies.

The ultimate success of any system furthermore must depend upon strict separation of the medical care rendered from the collection and administration of the payments therefor. In addition the certification of cash payments by the doctor must be modified or, better yet, eliminated altogether as the eighth Cleveland principle suggests. The physician should not be required to pass judgment by certificates or otherwise on cash benefits which his patient may receive. The doctor's duty is to secure the patient's return to health at the earliest possible moment.

Contract practice is in reality a kind of insurance benefit and it is essential that a safe and efficient plan for certifying to an incapacity for work should be formulated in any modification of the present system.

"It is pertinent here to ask," says Leland, "if the culmination of centuries of development, research and refinement in Medicine is to result in a mere mechanical manipulation under the control of a few non-medical managers, politicians or Social Theorists, or whether the profession shall evolve its own methods of providing sound scientific services at prices which the people can pay?" The management of this problem is our duty. It should not be left to laymen. If Organized Medicine can contrive and establish a satisfactory quality of medical care under the supervision of its County and State Societies, it will probably be able to control its members and guide them safely through this particular complication.

To recapitulate it may be stated that contract practice has a number of favorable aspects such as (Adapted from Leland Summary),—

1. Had its origin largely in necessity.
2. Has been legalized in some states by statute. (Oregon and Washington.)
3. Under some conditions and relations it is both ethical and legitimate.
4. Has some features that deserve refinement and expansion.

On the contrary it is relatively easy to enumerate a considerable variety of activities which are objectionable. Among these may be mentioned,—

1. Is largely limited, by choice, to the payroll class.
2. Does not in most cases extend its provisions to women and children.
3. Entirely excludes the indigent.
4. Successful operation frequently demands solicitation which is wholly commercial and unfair.
5. In general has become highly commercialized and competitive.
6. Concerns itself almost without exception to curative medicine and does not include preventive measures.
7. Shows no consideration for public or individual welfare.
8. In many instances is characterized by underbidding, sub-letting, mis-representation and racketeering.
9. Is economically unsound in many of its present forms.
10. Is actually a kind of unsupervised and unregulated health insurance.
11. Furnishes medical care which is often inferior in character.
12. Often used by practitioners to influence legislation in behalf of extension of the system.
13. Frequently officered and controlled by laymen who exploit the services of the doctors.
14. Has many features which are unethical and dangerous.
15. In many of its present developments, it lowers the confidence of the patient and of the public in the medical profession both as a body and as individuals.
16. Puts practice on a business basis and overloads the practitioner.

An analysis of this summary would seem to show that probably a majority of contract practice schemes are unethical in conception or unsound in operation or both. They are unsatisfactory to the patient for the most part and more or less distasteful, cumbersome and vexatious to the group except in the financial aspect. It is a phase of medical practice which the profession should scan with continuous and alertly critical attention. As Pusey remarks concerning another evil, "the physicians engaged in such organizations are little more than employees in a technical business. If these projects were numerous in our cities Medicine would lose the greater part of its attractiveness and would cease to call to its ranks the only kind of men it needs, namely—men of high ambitions and altruistic instincts."

Contract practice is a mass production pursuit which is sold to the employers instead of the potential patient and designed to compel the employes under contract coverage to accept medical service selected by a third interest which is usually commercial and sometimes hostile. It is possible of course that the efforts made by doctors to find new opportunities and variations for

the enlargement of their work is a sign of professional vitality but unhappily a careful study of all the claims, beneficial or otherwise, of this particular adventure, would indicate only a furtive and clandestine tendency to accept and develop an unlimited operation of medical commercialism notwithstanding the fact that no sound reason has appeared as yet to justify a relaxation or change in the ancient principles of medical ethics. Furthermore a recognition of commercialism in medicine which is met with indulgence marks the decline of professionalism and the beginning of political domination.

References—Leland, Pusey and Cabot, Judicial Council, A.M.A., 30 North Michigan Avenue.

YOUR RADIO PROGRAMS

Doctors of the state are presenting popular health programs each week for the Educational Committee of the Illinois State Medical Society. These are worthy of your time and attention.

At present time these health talks are given over the following Chicago stations, Eastern Standard Time:

TUESDAYS:

A. M.—WBBM
10:00 A. M.—WJJD
3:15 P. M.—WAAF
P. M.—WGN

THURSDAYS:

10:00 A. M.—WJJD

FRIDAYS:

3:15 P. M.—WAAF

On Tuesdays and Thursdays over WJJD at 10:00 A. M., beginning October 6 and continuing through October 27, there will be a series of talks "A Doctor's Diary" given by a doctor and his secretary, for the Committee. Your comments on the series will be appreciated.

A number of new types of programs are being tried out by the Committee, including some question and answer programs, and others in the form of symposiums by two or three doctors.

During the month of September the Committee was called upon to suggest programs for WLS and NBC, the latter was for a 50 station hook-up.

It is interesting to note that the Educational Committee since its formation, has given more than 3,000 radio broadcasts from Chicago Stations and has never paid one cent to the stations for the time.

The program director of one radio station recently stated that during the eight years the Commitee had presened hundreds of health talks over his station, not one single criticism had been received concerning any of them.

JEAN MCARTHUR.

WOMAN'S AUXILIARY TO THE ILLINOIS STATE MEDICAL SOCIETY

As president of the Woman's Auxiliary to the Illinois State Medical Society I extend to you cordial greetings. In this task that lies before us we are co-workers, dependent upon each other, therefore, it is only fitting that you be acquainted with our plans for 1936-37.

Education of ourselves and others, in matters directly affecting those connected with the medical profession will be stressed throughout the year. Mrs. John A. Wolfer, Chicago, Chairman of Public Relations, has already contacted all County Public Relations Chairmen outlining an excellent program of education for ourselves and others. It is suggesed that each auxiliary member contact her local Public Relations Chairman and ascertain how she may assist in this important phase of auxiliary activity. We should become acquainted with health conditions in our county and state, know which phases of health are being stressed and which neglected; we should know the health program and aims of our own Medical Society and that of other organizations, and just how these can best work together to bring desired results. We cannot hope to educate others until we are informed ourselves.

This year being a legislative year in Illinois there will be many opportunities for members to show their interest and lend support to our Legislative Chairman, Mrs. W. D. Chapman, Silvis, Ill., immediate past president of the State Auxiliary. Each County President is urged to appoint an active Legislative Chairman and when the Medical Society furnishes Mrs. Chapman instructions for the auxiliary's definite work in this department, we can swing into useful, active service immediately. When Mrs. Chapman's message goes forth to County Auxiliaries please respond quickly and enthusiastically in the manner requested.

We are not planning any great divergence from the plans of our past president on the matter of Programs but we are hoping to make definite progress toward an educational program for the individual member. Mrs. A. B. Middleton, Pontiac, will send to each County Program Chairman, within a few days, an outline for proposed program, and it is hoped many of these suggestions will be followed out.

It is my earnest hope and expectation that each member will place the auxiliary activities *first* on her calendar and keep our objectives uppermost in mind. Attend your local meetings regularly and endeavor to secure new members by your enthusiastic support of auxiliary objectives. While a member is eligible through her husband it is not the individual doctor she serves but his profession. Through the auxiliary she shares in the activities which advance the aims of the medical profession. Individually our efforts are often lost but from an organized standpoint our influence can be a great force in building in the minds of the laity an appreciation of the medical profession.

Quoting from a National Auxiliary bulletin the question each auxiliary member should ask herself is—"Shall I assist the Medical Profession or shall others charter the work and assume control?"

Mrs. Frank P. Hammond,
Chicago, Ill.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next written examinations and review of case histories of Group B applicants by the American Board of Obstetrics and Gynecology will be held in the various cities in the United States and Canada on Saturday, November 7, 1936, and on Saturday, March 6, 1937.

The next general examination for all candidates (Groups A and B) will be held in Atlantic City, N. J., on June 8 and 9, 1937.

Application blanks and booklets of information may be obtained from Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania. Applications for these examinations must be filed in the Secretary's office not later than sixty days prior to the scheduled date of examination.

HERNIA INJECTION FILM AVAILABLE

A very interesting 450 ft. of film has been made showing the technique in the injection treatment of hernia.

Any local, state, sectional or national association or any hospital staff having a 16 mm. projection available may borrow this film (without charge) for showing to members. The wide interest in this film makes it advisable that you arrange for your booking early.

Address Farnsworth Labs., 159 N. State St., Chicago, Ill.

THE SIXTY-FIFTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

The American Public Health Association releases the scientific program of its 65th Annual Meeting in New Orleans, October 20-23, with the publication of the September issue of the American Journal of Public Health.

More than 100 separate scientific sessions are listed, engaging upwards of 300 speakers. There are highly specialized programs designed to solve current problems in the fields of administration, nursing, school health work, health education, sanitary engineering, vital statistics, laboratory practice, child hygiene, industrial hygiene, epidemiology. There are programs covering over-lapping interests which involve several groups of specialists who come together in joint meetings for common discussion. There are programs broad enough in scope and of sufficient importance to warrant the attendance of the entire Association in general sessions.

The names of the speakers listed on the programs are familiar to everyone as public health leaders. The Annual Meeting of the American Public Health Association has been known for years as the place to hear the last word on disease prevention and control and health promotion from experts.

On the invitation of the Cuban Government and Florida health authorities, the Association will sponsor an all-expense post-convention tour to Havana via Florida by train, motor and steamer. Delegates are invited to join the tour.

The American Public Health Association offers a copy of the program which includes hotel and railroad information, a summary of the post-convention tour and other details concerning the Annual Meeting to those who write to the Association's office, 50 West 50th Street, New York City.

ANNUAL MEETING OF ILLINOIS STATE SOCIETY OF X-RAY TECHNICIANS

The annual meeting of the Illinois State Technicians will be held at the Hotel Pere Marquette, Peoria, October 24, 1936. The program for the meeting is as follows:

Oct. 24, 1936

LaSalle Room—Hotel Pere Marquette

Morning Session—9 A. M.

Registrations: 10 A. M.

Meeting called to order by the president, Margaret Hoing, R. T.

Address of welcome, Mayor E. N. Woodruff, Peoria, Ill.

Response, Ruth C. Beetz, R. T.

Business Meeting—First Section

President's address.

Appointing committees.

Committee reports.

How May We Make Our Regular Meetings More Useful to the X-Ray Technicians, Esther Perry, R. T., Evanston, Ill.

Discussant, Myrtle L. Jones, R. T., Peoria, Ill.

Demonstration of Positions in Radiography, Helen Luksik, R. T., Chicago, Ill.

The History and Technical Aspects of Kymoroentgenography, L. C. Neïdner, St. Louis, Mo.

General Discussion.

12:00

Luncheon

LaSalle Room—Hotel Pere Marquette

Presiding, Maude Krupp, Bloomington, Ill.

Speaker, G. W. Chessman, Pastor First Baptist Church, Peoria, Ill.

1:30 P. M.

Afternoon Session

Angulation in Dental Radiography, Ott Krog, Rochester, N. Y.

Discussant.

Radiography of the Optic Canal and Petrous Pyramids, Cesare Gianturco, M. D., Urbana, Ill.

Discussant.

The Elimination of Faulty Chemistry and Processing, H. A. Tuttle, R. T., Chicago, Ill.

Discussant.

The Technical Requirements of Chest Radiography, Roswell T. Pettit, M. D., Ottawa, Ill.

Chest Radiography, Edmund P. Halley, M. D., Decatur, Ill.

Discussant, Eleanor T. Mitchell, R. T., Oak Forest, Ill.

Anterior-Posterior Projection of Fifth Lumbar Vertebra, Harold G. Petsing, Chicago, Ill.

Discussant, Ralph R. Tarrant, R. T., Iowa City, Ia.

The Teaching of Anatomy by Radiography of the Cadaver, H. O. Mahoney, Chicago, Ill.

General Discussion.

The Registry as an Incorporate Body, George M. Landau, M. D., Chicago, Ill.

Discussant, Fauntleroy Flinn, M. D., Decatur, Ill.

Business Meeting—Last Section

Report of Committees.

Installation of New Officers.

Appointment of Committees for Coming Year.

Adjournment.

7:30 P. M.

La Salle Room, Pere Marquette Hotel

Annual Banquet

Toastmaster, Dr. F. S. O'Hara, Springfield, Ill.

Speaker, Dr. Ralph Willy, President Chicago Roentgen Society.

Speaker, Dr. Wm. M. Hartman, Macomb, Ill.

Speaker, Dr. H. K. Campbell, Springfield, Ill.

Entertainment

For further or detailed information, write Dr. Gentz Perry, 636 Church St., Evanston, Illinois.

THE CONSTITUTION

Our government functions in a tripartite manner—that is, through the legislature, the executive and the judiciary. So nicely balanced are these departments that one can not encroach upon the activities of the other without throwing the entire nation out of harmonious operation.

Without in anywise commenting upon the status praesens, the average voter November next will vote for his choice of president with scant or no thought as to who shall represent him in the National Congress. Somehow he feels that his president will take care of his every need. In other words, he makes the president a dictator—controlling the congress. Some go so far as to believe he ought to control the judiciary—the supreme court.

If we have a civilization worth while, it has developed within the metes and bounds of the constitution. Men of all nations have quitted their native country and have voluntarily lived under its beneficial rule. Perfect? No, it is not perfect. It is a human document inspired by Him whose superscription upon our coin reads In God We Trust.

Hasten the day when our Congress will be filled with our ablest men who will make laws for our welfare.

Hasten the day when our president will meet in Washington senators and representatives whose ability he respects.

Restore the day when all of us shall hold as a precious part of our heritage the sanctity of our supreme court. —Madison County Doctor.

REQUEST FOR DATA BY BUREAU OF HUMAN HEREDITY

The object of this Bureau is collection on as wide a scale as possible of material dealing with human Genetics. Later, the tasks of analysis of material and distribution of the information available will be added.

The Bureau is directed by a Council representing medical and scientific bodies in Great Britain. It is affiliated to the International Human Heredity Committee, which ensures co-operation in all areas where research is proceeding.

The Council would be grateful to receive all available material from Institutions and individuals, furnishing well authenticated data on the transmission of human traits whatever these may be. Pedigrees are particularly desired; twin studies and statistical researches are also relevant. As research workers and others who send in material may in some cases wish to retain the sole right of publication (or copyright) those who so desire are asked to accompany their material with a statement to that effect.

Material should be given with all available details in regard to source, diagnostic symptoms and the name and address of the person or persons who vouch for accuracy. All such details will be regarded as strictly confidential.

Reprints of published work would be most acceptable. Further, many authors when publishing material may also have collected a number of pedigrees which they have been unable to reproduce in detail. It is the object of the Council that such records, by being included in the Clearing House, should not be lost.

Those wishing for a copy of the Standard International Pedigree Symbols may obtain one from the office.

Announcements in regard to the services undertaken by the Bureau will be published from time to time.

Forward Data to 115, Gower St., London, W.C.I., England.

Executive Committee : R. A. Fisher, J. B. S. Haldane, E. A. Cockayne, J. A. Fraser Roberts, L. E. Halsey (Hon. Treasurer), C. B. S. Hodson (Hon. Gen. Secretary).

BLOOD PRESSURE, HOT DOGS AND MERRY-GO-ROUNDS

The old-fashioned medicine man is slowly disappearing from the sideshows and county fairs but today a new charlatan is taking his place at beach resorts, fairs and amusement parks. Equipped with a white coat, a stethoscope and a bloodpressure instrument, these operators are capitalizing on the public's interest in bloodpressure. Their main concern is collecting the ten or fifteen cents they charge per "patient."

It is evident that bloodpressure readings taken by such persons under such circumstances are of no value. The "patient" is simply being bilked but the most harmful part of this practice is the serious consequences that may easily result in some cases regardless of whether the information is erroneous or otherwise.

We are vigorously opposed to this misuse of medico-scientific instruments, having gone on record with the American Medical Association to this effect a year ago. Moreover, we have refused to fill large orders for Baumanometers to be used for such purposes.

This evil practice should be stopped and we would appreciate your co-operation in reporting to us any

instance that comes to your attention—especially where some definite harm has resulted to a patient.

W. A. Baum Co., Inc., 460 West 34th Street, New York. Since 1916. Originators and Makers of Blood-pressure Apparatus Exclusively.

MAGGOT STUDY YIELDS NEW FACTS ON UREA

Digging deeper into the recent mystery of how blow-fly maggots stimulate healing in stubborn wounds, a fact observed by surgeons during the World War, Dr. William Robinson of the U. S. Department of Agriculture now announces the possibility that urea, a well-known and widely distributed chemical, may be responsible along with allantoin for this remarkable healing produced by maggots.

In an article appearing in the August number of the American Journal of Surgery, Doctor Robinson cites case histories provided by physicians, surgeons and dentists, who have used urea solution in the treatment of osteomyelitis, gangrene, old ulcers, stubborn wounds, infected burns and non-healing gums and tooth sockets. The reports are encouraging. If borne out by subsequent clinical tests, Doctor Robinson's discovery will be of great importance to the medical profession.

These physicians and many others became interested in the use of urea through a previous interest in allantoin, which in fifteen months has come into extensive manufacture and wide use from the starting point of an obscure and practically unused chemical.

Urea is present in the tissues and blood of animals and humans and is of common occurrence in plants, including many used as food, such, for example, as spinach. However, it got its name from the fact that it was first found in urine, in which form the excess nitrogen is removed from the body. Urea is of great historic interest since it was the first organic chemical ever to be made synthetically. That epoch-making discovery was made more than 100 years ago.

Urea is an almost snowlike, crystalline chemical, and under the microscope a pinch of it looks like a miniature log jam of sparkling stocks of ice. Chemists now make it by the ton by combining three gases which occur in air or water—nitrogen, hydrogen and carbon dioxide.

In the treatment of wounds, urea has been used mostly as a two percent solution, but, unlike allantoin, it is highly soluble and heavy solutions may be made. Pure urea, much used by doctors as a diuretic, sells for only a small fraction of the price of allantoin.

Attention was called to the healing possibilities of urea not only because it was associated with allantoin in maggot excretions, but also because the chemical "picture" of allantoin shows how easily its "side chain" might be "chipped" off by hydrolysis to form urea. It has been suggested that this "chipping" may occur when allantoin is used in wounds, leaving urea as an active agent in healing.

ACADEMY OF PHYSICAL MEDICINE

The Academy of Physical Medicine will hold its Annual Meeting in Boston, Massachusetts, at the Hotel Statler on October 20, 21 and 22, 1936.

The program is educational in character and contains symposia and reports on the newer studies and clinical developments in Physical Medicine presented by recognized authorities in the various fields of medicine and basic sciences.

An informal dinner at the Ring Sanatorium is scheduled for Tuesday evening, October 20. The Annual Academy Banquet will take place on Wednesday evening, October 21, at the Hotel Statler.

An elaborate program has been arranged for the visiting ladies.

All members of the medical profession are cordially invited to attend. A program will be mailed on request. William D. McFee, M. D., Chairman Executive Committee, 41 Bay State Road, Boston, Mass. Franklin P. Lowry, M. D., Secretary-Treasurer, 313 Washington St., Newton, Mass.

RESOLUTION RECOMMENDING THE APPROPRIATION OF ADEQUATE FUNDS FOR THE MAINTENANCE AND GROWTH OF THE ARMY MEDICAL LIBRARY'S BOOK COLLECTION AND INDEX-CATALOGUE

The Medical Library Association, comprising two hundred of the medical libraries of the United States and Canada, assembled in its thirty-eighth annual session in St. Paul, June 22, 1936, notes with pleasure and pride the appearance of volume one of the Fourth Series of the *Index-catalogue* of the Library of the Surgeon-General's Office, United States Army (Army Medical Library). The Association records with satisfaction the abbreviations and changes in composition in this new volume effecting a saving of twenty per cent in space with accompanying reduction in cost.

After a delay of three years during which no volumes of this *Catalogue* were printed, the appearance of this first volume of the Fourth Series gives renewed assurance of the continuation of this publication, which, together with the Army Medical Library, is considered the outstanding contribution which our country and its Government have made to medical knowledge, and

WHEREAS, The value and usefulness of the *Index-catalogue* is dependent upon the completeness of the files of medical publications contained in the Library of the Surgeon-General's Office—a public, national, medical library, the greatest in the world, serving in its present form of administration with satisfaction the medical profession and the medical libraries of our country, and

WHEREAS, In recent years the annual appropriation of the Congress has been wholly inadequate to provide sufficient funds to acquire the current medical books and periodicals issued throughout the world, so that they might be available for use throughout the country and for inclusion in the *Index-catalogue*.

Therefore Be It Resolved, That the Medical Library Association urges the Congress to appropriate annually to the Library of the Surgeon-General's Office an adequate sum for current medical books and periodicals and for the purchase of back publications lost during those recent years when the amount granted was grossly inadequate, thus depreciating the completeness and usefulness of the Library's collection; and an additional

sufficient sum annually, for as many years as may be required, in order to make for the greatest possible completeness of the collection and its *Catalogue;* and

Be It Further Resolved, That a sum be appropriated annually to defray the cost of printing regularly each year not less than one volume of the *Index-catalogue,* and

Be It Further Resolved, That a copy of these resolutions be spread upon the minutes of the annual meeting of this Association and sent to the President of the United States, the presiding officer of both houses of Congress, the Secretary of War, the Surgeon-General of the Army, and to the national, state, and other medical periodicals with a request for publication, and to the members of this Association, urging the organization of which they are a part and all other medical associations and institutions to adopt similar resolutions to be sent to their local members of Congress requesting their support of these measures.

A POLITICAL PRESCRIPTION FOR DOCTORS

Competent political observers predict that a heavier vote will be cast at the national election in November than ever before. They are forecasting also that a substantial shift will take place in party representation at Washington. Opinion is almost unanimous that the middle West will be the principal battle ground of the political conflict. A few profound thinkers believe that the control over the national government is destined ultimately to repose permanently in the middle West because the population in that region control a greater volume of actual and potential wealth than the inhabitants of any other part of the country.

Politicians are not ignorant of these shifting scenes. Hungry always for a square meal of popular opinion they are eager to grasp even the crumbs of information that point toward any significant change in public thought with respect to government and legislation. They have detected and publicly recognized a more conservative attitude, particularly concerning the curtailment of production and vast expenditures. They know that radical legislation appeals less to the people now than it did three or four years ago.

The ears of every politician are still tuned to the voice of the voters in his home district, however. He believes that important changes in the governmental functions to meet the requirements of the new order are bound to come and he is anxious to know what his constituents want in this respect. He is a superlative listener, the best in the world, and he wants to go to the legislature or to congress on a platform that will make his tenure permanent.

This situation puts the medical profession into a particularly advantageous position with respect to exercising an influence on the trend of legislation. Voting on election day is not much more than the ring of the bell or its silence that proclaims whether or not the bullet hit the bull's eye. Expressing your views, especially on medical problems, to the candidates is the power that drives the bullet home. The high standing enjoyed by physicians in their communities gives weight to their opinion. By direct and indirect contact with candidates for office, physicians can let it be known where they stand on questions of legislative importance and in that way become a potent factor not only in moulding public opinion but in the construction of new laws.

The exercise of political franchise in the effective manner suggested was never more important to physicians than at this moment. Although the trend is now away from radical legislation, political thought is still in a state of flux. Such matters as compulsory health insurance, the regimentation of doctors and granting to corporations the privilege of medical practice, to say nothing of antivivisection and lowering the standards of medical practice are merely quiescent and by no means settled. Tax problems are far from being a closed account. Social security with all its implications has been solemnly promised to the public by all responsible candidates. The course toward the solution of these issues remains to be decided. Here the physician has a stake. He has an opportunity, a privilege and a duty.

Now is the time for the doctor to use his influence. Bewailing the curse of injudicious laws and damning politicians after statutes have been written is a clumsy, expensive way to correct evils that need never be born. Some vigorous birth control procedures applied to the fertile soil where legislation breeds in the minds of candidates before election is the soundest and best prescription against undesirable laws.

Your Legislative Committee wishes to urge upon you the duty and responsibility that is yours in respect to political matters. How or for whom you vote is relatively unimportant so far as party alignment is concerned. Your polit-

ical faith, so far as parties are concerned, is a matter of indifference to your Committee. That you make contact with candidates and express your opinions on medical problems is of the greatest importance, however.

Illinois will be in the very center of the national political battle ground. This state will undoubtedly become a greater factor in moulding political opinion as time goes on. How the physicians here express themselves will have no secondary importance on the thought of the medical profession throughout the country. This has been the experience of the past and less may not be anticipated in the future.

Political doctors may be second rate physicians but the ablest physicians can and ought to doctor politics. Now is the time to do a bit of doctoring when it will count the most.

JOHN R. NEAL, M. D.,
Chairman, Legislative Committee.

PICRIC ACID—SODIUM ALUM SOLUTION RECOMMENDED A POLIOMYELITIS PREVENTIVE

To The Medical Profession of Illinois:

The unusually heavy prevalence of poliomyelitis in Illinois at this writing and the possibility that several hundred new cases will develop before the epidemic wave subsides, makes imperative the employment of every practicable means available for controlling the disease. Experimental work done in the National Institute of Health of the U. S. Public Health Service and elsewhere indicates that a nasal spray of picric acid and sodium alum may prevent poliomyelitis if applied prior to infection, although the preventive value of such a solution has not been proved among human beings and may not be effective in all cases. This preparation gave complete protection, however, to 20 monkeys that were sprayed and subsequently inoculated with poliomyelitis virus, while 16 out of 20 unsprayed control monkeys got the disease after inoculation.

The formula and method of using the solution recommended by Armstrong and Harrison, who conducted the experiments for the United States Public Health Service are as follows:

FORMULA

Solution A—Dissolve 1 gram of sodium alum (sodium aluminum sulphate C.P.) in 100 cc of physiological salt solution (0.85 percent). Turbidity may be removed by filtering one or more times through the same filter paper of Berkefeld filter.

Solution B—Dissolve 1 gram of picric acid (C.P.) in 100 cc of physiological salt solution (0.85 percent). (Warming will facilitate solution.)

Mix equal amounts of solutions A and B. This gives a 0.5 percent solution of each ingredient, which is stable, and it is this mixture which is to be dispensed.

On the appearance of cases of poliomyelitis in the community, spray the nose thoroughly once daily on alternate days for 3 or 4 applications, then once weekly thereafter for the duration of the poliomyelitis season. The spray should be directed upward toward the top of the head.

Upwards of 215 cases of poliomyelitis were reported in Illinois during September, the highest monthly incidence since 1917. While Cook and Winnebago counties have suffered more severely than any other localities, cases have been reported from 38 counties during the last six weeks. If prevalence runs a course similar to that in all previous years, at least 200 cases will occur during October and from 300 to 400 cases before the end of the year.

Under these circumstances I have no choice but to suggest as a possible preventive against poliomyelitis the picric acid sodium alum solution described above. While an accurate appraisal of the prophylactic value of this preparation, when used in people, will be difficult if not impossible, it undoubtedly prevents poliomyelitis in animals under experimental conditions and warrants at least a trial in general practice.

Very truly yours,

FRANK J. JIRKA, M. D.,
Director State Department of Public Health.

CONSERVATIVE TREATMENT FOR HABITUAL DISLOCATIONS OF SHOULDER

Arthur G. Davis, Erie, Pa. (Journal A. M. A., Sept. 26, 1936), states that (1) the treatment outlined has eliminated the necessity of operative measures in 75 percent of a consecutive series of typical recurrent dislocations; (2) the patient is only somewhat disabled during a short period of treatment, and (3) the evidence submitted suggests that this short period of treatment yields results of a permanent kind and therefor offers an alternative to operative approach.

Original Articles

INJURIES TO THE ESOPHAGUS

CHARLES D. SNELLER, M. D.
PEORIA, ILL.

Injuries to the esophagus vary from simple abrasion to total perforation. They may be caused by instrumentation, by the accidental passage of foreign bodies through the normal esophageal orifice, by bullets and penetrating bodies passing from the outside into the esophagus, or by the accidental swallowing of substances called food or included in the food.

This paper is based upon the records of 100 consecutive, unselected esophageal cases from the writer's private practice. The considerations will necessarily be general because, in such a cross-section of this phase of oto-laryngological practice, a full and careful study would require more space than is allotted.

Anatomy. The esophagus is an elastic, flexible, almost completely collapsed tube extending from the hypopharynx to the cardiac end of the stomach. It is lined by stratified epithelium, arranged in longitudinal folds and pierced, at the cardia and in two small lateral areas in the upper esophagus, by a few superficial glands, and throughout its length by the orifices of some 200 or more true esophageal glands. Immediately beneath the epithelium is the thin tunica propria resting upon the longitudinally arranged muscularis mucosa.

Beneath the muscularis mucosa lies the looser areolar connective tissue which unites the true muscular layers with the mucosa. In this submucous coat lie the lymphatic and venous plexus, the submucous or Meissner's sympathetic plexus and the true, deep esophageal glands. Beneath the submucosa is the thick circular muscular coat arranged in bundles. Between this and the external or longitudinal muscle layer is a narrow loose connective-tissue septum in which lie the larger blood vessels and the outer sympathetic nerve plexus of Auerbach. Outside this longitudinal layer of muscle is the loose fibrous adventitia containing the largest lymph and blood vessels and the branches of the vagus nerve which supply the three esophageal layers.

Read before Section on Eye, Ear, Nose and Throat, Eighty-sixth Annual Meeting, Illinois State Medical Society, Springfield, May 19, 1936.

The true or deep *esophageal glands* of the submucosa are arranged in groups, longitudinal to the long axis of the esophagus. They are usually about one millimeter in length and have one secretory duct with a dilated collecting chamber. The duct usually empties towards the cardia though some may empty towards the larynx. These ducts and dilated collecting chambers may at times be the points of entry of small foreign bodies and of bacteria. These glands, controlled by the vagus and more abundant in the upper half of the esophagus, secrete a special mucus different from any other in the alimentary canal. Though this secretion is thought not to have enzyme action, it is due to its diffuse covering of the entire mucosa and to its alkaline and other characteristics, that it is the greatest barrier to the absorption of toxic products and bacteria. It is only when this mucoid covering is removed or the mucosa is penetrated, that bacteria or acid gastric juices can affect the esophagus.

It may be of interest to mention here the experiments of Friedenwald and others (1928) in which they produced small abrasions in the esophagus of dogs through the esophagoscope. They observed that these lesions healed rapidly under usual conditions and that healing was delayed or the lesions ulcerated when HCl was given to the dogs in their diet. They also took deep bites into the deeper esophageal structures and found that feeding HCl markedly retarded healing, or ulcers were made to perforate. Similar deleterious effects may occur in man when vomiting of gastric juices takes place in the presence of esophageal lesions.

The *arterial* supply of the esophagus varies much in different parts. The cervical is richly supplied by the inferior thyroid and an occasional branch from the subclavian artery. The thoracic portion is variably supplied by anterior and posterior branches of the esophagotracheal arteries and by branches of the intercostals and the aorta. The right wall of the lower thoracic portion has the poorest supply. The abdominal portion is less well supplied by the gastric, inferior phrenic arteries and branches from the aorta.

The esophageal *veins* form a submucous and a periesophageal plexus. The upper portion drains into the inferior thyroid vein and superior vena cava and the lower portion into the azygos and

intercostal veins. Kegaries and others state that the normal veins in the submucosa often assume sinus-like dimensions and are therefore vulnerable to hemorrhage in various conditions such as passive congestion of the portal system, etc., and in injuries and ulcerations of the esophagus.

The *lymphatic* system (Jackson, C. M.) is arranged in a mucosal and a submucosal plexus. These drain by three groups of collecting vessels into deep cervical glands, into the bronchial and posterior mediastinal glands and below into the gastric nodes. As in infections of the nose and throat, various cervical glands swell and become tender, so likewise, in infections secondary to injuries to the esophagus, the deep cervicals, the bronchial or mediastinal or the gastric nodes may swell and become tender. Therefore this may be the explanation of various symptoms presented by patients with injuries and infections of the esophagus.

The *sympathetic* nerve supply is divided into the submucous plexus and the myenteric (Auerbach's) plexus. The vagus supplies the secretory glands of the esophagus. There is an anterior and a posterior anastomoses between the right and left vagus nerves. The sympathetic and vagus plexus communicate. The recurrent laryngeal nerves also give branches to the upper esophagus.

It is well known that the esophagus is normally closed at both ends, the upper by the cricopharyngeus muscle and the lower by a more or less well defined muscular pinch-cock. It is also well known that the most definite narrowing of the esophagus occurs where the arch of the aorta crosses it. Other places of compression are at the upper thoracic orifice and where the left main bronchus crosses the esophagus.

The esophagus courses downward behind the trachea, gradually shifting to the left of the midline and then again toward the right at the cardia. In its course through the neck, infections may extend from it into the region behind the thyroid gland, the deep facia and the carotid sheath. In the posterior mediastinum, it courses immediately next to the aortic arch, the left main bronchus, the recurrent laryngeal nerves and close to the pleura and the pericardium. Affections of the esophagus may easily affect and invade the surrounding structures and, likewise, affections of the surrounding structures may compress or invade the esophagus.

Analysis of Cases. In a brief analysis of this group of 100 consecutive esophageal cases, it was found that carcinoma occurred 7 times, true spasm without apparent lesion 5 times, obstruction due to compression in disease of adjacent structures 6 times, congenital anomalies in one case, periesophageal hematoma in one case, paraesophageal abscess in three cases and mediastinitis in 4 cases.

The lesions of the esophagus are arranged according to the objective findings seen through the esophagoscope. These are edema, abrasions, lacerations, ulcers, esophagitis, hemorrhage, stricture, complete obstruction, incomplete and complete perforation, and mediastinitis.

Abrasions were seen 5 times in the cervical esophagus, 4 times at the upper thoracic orifice, once at the aortic arch and once at the crossing of the left main bronchus. Edema occurred almost as often at the same sites. Only twice was it evident that the abrasions ulcerated and these were due to considerable vomiting before the offending foreign body was removed.

Case 1. Male child, 3 years of age, swallowed a penny four hours before admission. Vomiting was severe and frequent. *Esophagoscopy:* abrasions of lateral walls and bleeding from the crico pharyngeus to the upper thoracic orifice. *Outcome:* very slow in healing. Probably due to action of gastric juices on lesion. (Fig. 5.)

Lacerations occurred 12 times in cricopharyngeal region, 10 times in cervical esophagus, 23 times at upper thoracic orifice, 5 times at aortic arch, once at crossing of left bronchus and twice in lower esophagus. These healed promptly after removal of the offending body except in cases where much vomiting occurred.

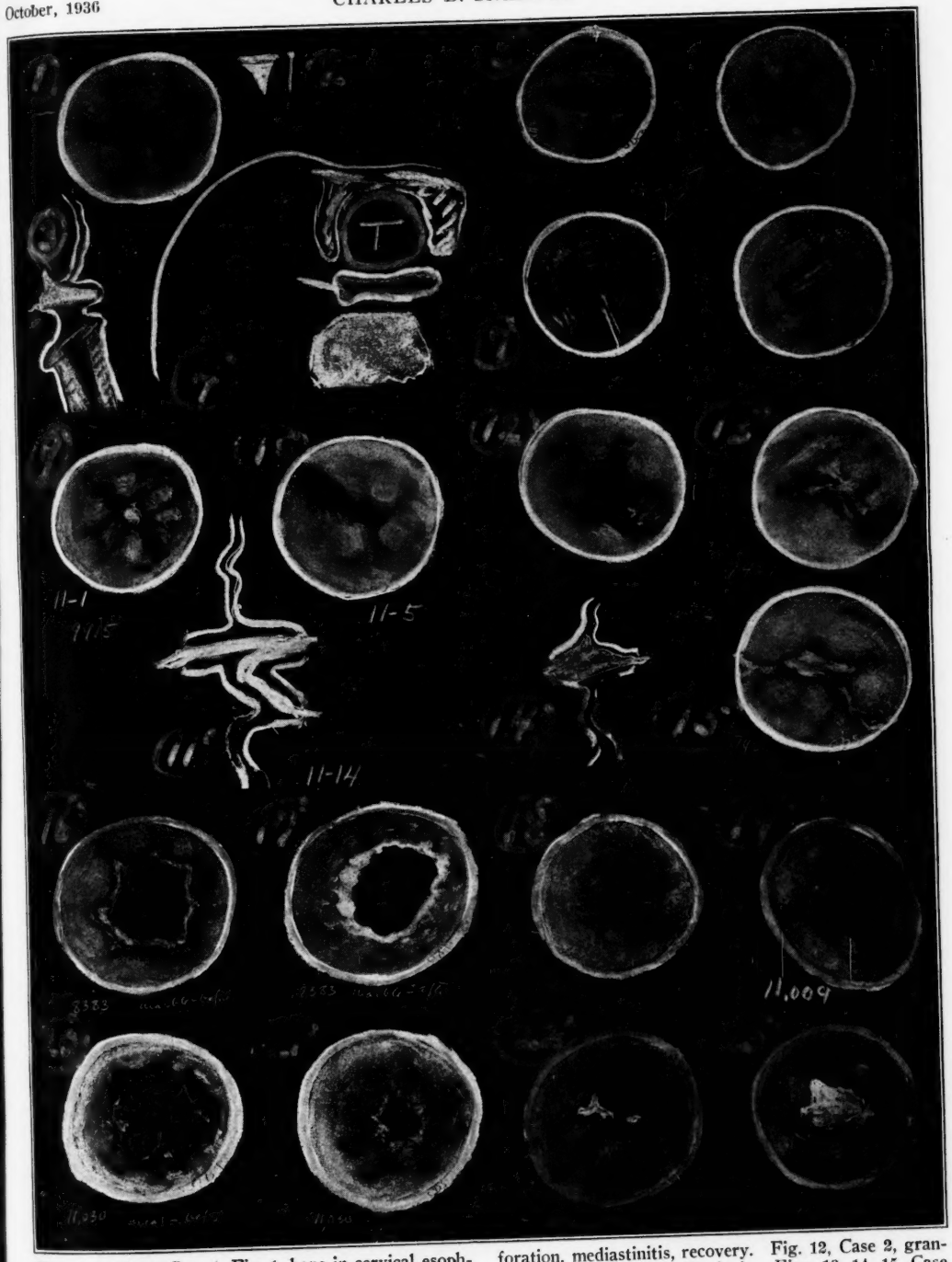
Of the true *ulcers* seen at first esophagoscopy, 4 were at the cricopharyngeus, 3 in cervical esophagus, 6 at upper thoracic orifice, two at aortic arch, two at left main bronchus and 3 in lower esophagus.

Case 2. Male 53 years of age. Thought he had swallowed a hair two weeks before admission. He noticed that it would move up and down in his esophagus when he would swallow. Considerable discomfort in cervical region when swallowing. Pains in right side of neck. Some hesitancy in moving right arm. (Fig. 12.)

Examination by x-ray: Capsule arrested at upper thoracic orifice.

Esophagoscopy: Mass of granulations in ulcerated area about half inch wide, in right side of esophagus at upper thoracic orifice. In this mass a piece of enamel porcelain (1x3x4 mm) was found and removed.

Outcome: Pain and difficulty in using right arm



Figs. 1 to 4 from Case 4. Fig. 1, bone in cervical esophagus covered with arterial blood. Fig. 2, bone. Fig. 3, side view of perforating bone and scope—diagrammatic. Fig. 4, cross section of neck showing relationship of hematoma and foreign body. Figs. 5, Case 1, coin in eos, abrasion. Figs. 6 and 7, Case 6, mucosa torn from muscularis by bamboo pole. Fig. 8, Case 9, clock key with perforation and granulations. Figs. 9, 10, 11 of Case 12, edema, esophagitis, laceration, perforation, mediastinitis, recovery. Fig. 12, Case 2, granulation, ulceration, foreign body. Figs. 13, 14, 15, Case 8, lacerations, incomplete perforation, foreign body. Figs. 16, 17, Case 13, marble in stricture causing esophagitis, gangrene. Fig. 18, Case 7, fish bone perforating, ulcer, eosophagitis. Fig. 19, Case 19, laceration, perforation, level left main bronchus. Figs. 20, 21, Case 5, complete obstruction by meat in old lye stricture. Figs. 22, 23, Case 10, perforation, laceration, chicken bone.

passed off in 3 or 4 days. It is possible that this small foreign body had been caught in one of the ducts of the esophageal glands.

Case 3. Female, aged 23, got chicken bone caught in esophagus. Swallowed easily for several days and then with increasing difficulty and with some pain. Pain developed in right chest on the fifth day and become constant by the seventh. *X-ray:* capsule arrested at crossing of left main bronchus. (Fig. 19.)

Esophagoscopy: A large irregular chicken bone was found and removed from just above the crossing of the left main bronchus. Several deep lacerations with ulceration and esophagitis were present.

Outcome: With bismuth and sterile liquids recovery in about ten days.

Esophagitis was evident upon first examination, 3 times at cricopharyngeus, twice in cervical esophagus, once at aortic arch, once at bronchial crossing and once in lower third.

Hemorrhage occurred into the esophagus and interfered with examination and treatment, once in cervical esophagus, 8 times at upper thoracic orifice, twice at aortic arch and once at bronchial crossing. The hemorrhage in the cervical region was arterial and also produced a very large hematoma of the neck.

Case 4. Woman, 62 years of age, while eating creamed chicken, felt a sudden stabbing pain in right side of neck. Talking and swallowing increased the pain. At the same time a mass appeared in the left side of the neck, pushing the thyroid gland forward. Upon admission an hour later, right side of neck was bulging forward and laterally making a mass the size of a large fist.

Esophagoscopy: About two hours after the accident a 9 mm esophagoscope was passed. As the end passed the lower border of the crico pharyngeus muscle, bright red blood gushed into the scope. After cautious asperation, a long, grayish, thin object was visible lying across the esophagus about 1 cm below the cricopharyngeus. The instant the object was touched with a side curved forceps, another gush of bright red blood filled the esophagoscope. After carefully aspirating this blood, the object was not to be found. The scope was passed to the stomach but it was not found. As the scope was withdrawn, a laceration about an inch in length was seen just below the crico pharyngeus. Because the arterial hemorrhage had been so profuse, it was thought advisable not to explore further at the time. (Figs. 1 to 4.)

Outcome: Course was uneventful. No rise in temperature, pulse or respiration. Mass in neck seemed to be getting smaller. Patient was up and about on the eighth day. She ate light foods without much discomfort. On the tenth day, about 5 a. m., while sleeping in bed, patient passed out. No hemorrhage or other cause of death was evident.

Autopsy revealed the esophagus healed. In the neck, behind the thyroid and medial to the displaced carotid, was a massive organizing hematoma. Projecting into this, from the adventitia of the lateral esophageal wall, was a triangular piece of bone about an inch in length along each side, about an eighth of an inch thick and as sharp as a razor blade. All other structures appeared normal. Though death was thought to be due to hemorrhage and infection but no convincing evidence could be found. The brain was not examined. Cause of death unknown.

Stricture was observed twice in cervical esophagus, 5 times at upper thoracic orifice, once at aortic arch and twice in lower esophagus. One case gave a luetic history. Another (baby) swallowed "heated oil." Eight were due to swallowing lye. Foreign bodies were arrested at the strictures and produced esophagitis and ulceration. In two cases the secondary inflammations caused eventual death.

Case 5. Male, aged 43 years, choked three days before admission. Unable to eat or drink anything since. Vomited food within a few seconds after attempts at eating. Soreness in chest for two days. Much mucus had come up into mouth before accident but none since. Five years before, this patient had accidentally swallowed lye. Six months before he choked on a piece of steak. This came up within three days without assistance.

Diagnosis: Complete obstruction of esophagus in mid-thoracic region at site of old lye stricture.

Operation: Esophagoscopy. Removal. Esophagitis and ulceration present.

Outcome: Recovery.

OUTCOME: RECOVERY

Complete obstruction occurred ten times, four in cervical esophagus, two at upper thoracic orifice and four in lower esophagus. External pressure on esophagus, esophageal carcinoma and foreign body were the causes.

Incomplete Perforation. Perforations may be divided into two groups. The *incomplete* perforate various depths or as deep as the muscularis. The *complete* perforate through the muscularis into the adventitia or deeper. Incomplete perforations occurred twice in the cervical esophagus, five times at the upper thoracic orifice, three times at the aortic arch, twice at the left bronchial crossing and three times in the lower esophagus.

Case 6. Boy 5 years old, while playing with broken bamboo pole in his mouth, stumbled and rammed the sharp and irregular pole down into his mouth and esophagus. No vomiting.

Esophagoscopy: Mucosa torn loose from the muscularis on the left side of the neck from the cricopharyngeus downward about two inches. Not much bleeding. No dirt or foreign body found.

Outcome: Recovery in week after use of sterile liquids and frequent cleasing of mouth and taking bismuth powders.

Case 7. Male, aged 55 years, while eating fish four days before admission, got bone caught somewhere in esophagus. Last two days he complained of discomfort and a fullness deep in his chest. X-ray was negative. Because of the persistent discomfort in chest, esophagoscopy was asked. (Fig. 18.)

Esophagoscopy: In mid-thoracic region, on the left side of esophagus, a very small hair-like object was seen projecting into esophagus. This was removed. It was a slender fish bone which had had about one eighth inch projecting into the esophagus and about one inch perforating the wall of esophagus. Some esophagitis and small ulcer present.

Outcome: Discomfort in chest passed off within two days. Recovery uneventful.

Case 8. Male, aged 27 years. About 24 hours before admission, while eating, something very sharp got caught in cervical esophagus. Swallowing became very painful and he began spitting bright red blood. X-ray with barium showed complete obstruction in upper half of cervical esophagus. (Figs. 13, 14, 15.)

Esophagoscopy: Laceration with bright red blood about nine o'clock in mid-cervical region. Unable to pass scope farther on account of edema and spasm. Next day scope could pass a little farther but still edema and spasm prevented reaching foreign body. Four days later, a third attempt was made. The edema was gone and very little swelling remained. As the foreign body was being freed from one side, it slipped from forceps and went on down the esophagus ahead of the scope. Deep lacerations with ulcerations were present.

Outcome: Recovery in one week.

Note: If vigorous attempts had been made to force the scope past the swollen and edematous tissues, perforation and serious outcome would have been certain. If blind bougienage had been done, fatal outcome could have been predicted.

Case 9. Girl two years of age. Five days before admission swallowed a clock key. X-ray showed the large part to be caught just below the aortic arch, while the sharp part was perforating the region at the aortic arch. (Fig. 8.)

Esophagoscopy: Under ether (the only case we have given ether for removal of foreign body from esophagus) key was removed. Mucosa markedly eroded over aortic arch. Blood and purulent granulations. Erosion penetrated to the muscularis.

Recovery after five days with sterile fluids and bismuth.

Complete perforation occurred three times in cervical esophagus and once at upper thoracic orifice. One case had perforation of hypopharynx and lacerations of upper thoracic orifice. The perforation led to thrombosis of the internal jugular while the lacerations of the esophagus healed.

Case 10. Female, 62 years of age, choked 24 hours before admission while eating chicken pie. Physician attempted to push down foreign body by probing. Some discomfort deep in neck and chest. Pains in deep cervical region, low in left side of neck. Left side of head sore. Difficulty in raising left arm. X-ray with barium showed spasm at upper thoracic orifice and at level of crossing of left main bronchus.

Esophagoscopy: Two lacerations down to muscularis at level of upper thoracic orifice. Two deep lacerations with some muco-pus above foreign body at crossing of bronchus. Bone was about two inches long and very irregular. As it was removed from one side of esophagus, forceps were changed to get better presentation. As this was done, bone began slipping down esophagus and stayed ahead of scope.

Outcome: Recovery in about ten days.

Note: A bone, very sharp and irregular on both ends and perforating, presents the type which brings about a fatal outcome when blindly manipulated.

Case 11. A woman 48 years of age swallowed a piece of glass three years before admission. Two other attempts had been made by physicians, three and two years before but had been unsuccessful. During the past year the patient's right arm had become so weak that she was unable to raise it to dress herself. The right side of her neck was swollen and tender, she said. At times much foul material was regurgitated.

Esophagoscopy: Just below cricopharyngeus muscle in right side of esophagus, there appeared to be a very irregular loose tissue stretched across as though there were a pocket leading from the normal esophageal lumen into the peri-esophageal tissues. This "membrane" separated easily as the scope was passed. The tissues in this pocket looked like very dense, somewhat necrotic, material without any evidence of epithelium. About 1½ inches into this pouch some gritty mass was felt and removed. It was the irregular piece of glass which she had swallowed three years before.

Outcome: Upon arrival in her room, subcutaneous emphysema was so extensive that it extended from below the lower jaw downward over the chest. The patient's color was grayish blue. She quickly relieved some of our alarm by saying that this same thing had occurred at both other operations and that it soon passed off.

Recovery of use of right arm occurred in about one month, at least for ordinary purposes. Eight months later the patient died from some other cause. No autopsy was obtained because she lived in a distant city.

Note: Here was a case of complete perforation into the tissues outside the muscularis. The local resistance was remarkable. The chronic paraesophagitis was extensive.

Mediastinitis occurred four times, once following esophagitis and three times following complete perforation.

Case 12. Woman, 43 years of age, got chicken bone caught in esophagus while eating five days before admission. Upon admission she complained of gnawing pains deep in her chest and very painful breathing. She was very anxious and restless all the time. Temperature was 103 on second day. On third day she was unable to swallow even liquids. Upon admission she was so sick and weak that ice packs on neck and upper chest and subcutaneous liquids were given. Upon the

third day after admission she was able to swallow a little water. On the next day esophagoscopy was done. (Figs. 9, 10, 11.)

Esophagoscopy: On Nov. 1, a perforation filled with granulations down to the muscularis was seen below the cricopharyngeus. Esophagitis with swollen mucosa was so marked that even a 7 mm scope could not be passed further. On Nov. 5, still unable to pass even 6 mm scope. Much foul pus and granulations present. On Nov. 14, 7 mm scope passed down to a very extensive area of esophagitis, granulations and foul pus. After aspiration and removal of much of this debris, a very slender bone about 2½ inches long was encountered at the upper thoracic orifice. Bone was carefully loosened from its bed on one side and found to have two long prongs buried deep into the muscularis on the opposite side. Upon removal, the bone was covered by foul, necrotic material, smelling like carious teeth.

Outcome: Within ten days temperature had subsided and patient discharged.

Note: Here is another case which would have proven fatal if blind probing had been resorted to. It is likely that death would have resulted if the bone had been exposed and removed by force at the first esophagoscopy. Nowhere else in the body would we attempt to tear into structures as vitally important as these and permit extension of a virulent infective process.

Case 13. A boy, 9 years of age, swallowed a marble while playing. Physician attempted to push it down with stomach tube. Patient became critically ill the same night and was rushed to the hospital about 60 miles away. (Had swallowed lye at 2 years of age. For several years had difficulty in swallowing but had improved past 2 years.)

Examination: Underweight boy, very pale and very sick. Much saliva filling mouth and some passing into trachea.

Esophagoscopy: 7 mm scope passed down to level of upper thoracic orifice where the mucosa was markedly edematous. In the center of area was the marble, barely visible. No forceps spaces. With small esophageal bougies, one area to left of marble was gently dilated. Small spoon entered but as marble was being raised, it slipped downward and caught in a second stricture about one inch below the upper one. (Figs. 16 and 17.)

Course: Next day temperature 101 to 102. Fluids were given subcutaneously. Second day temperature was 102 to 103. Patient was delirious much of the time.

Second esophagoscopy was done on third day. Edema not much worse than the first attempt. With gentle dilitation by small esophageal bougies, forceps spaces were made and, with a larger esophageal spoon, marble was raised out of its bed, up past the upper stricture and removed.

Course: Fourth day after admission, temperature 102, respiration 40 and pulse rate 120. Able to swallow liquids. Delirious most of time. Neck rigid. Fifth day, temperature 104 to 106R. Respiration 30 to 40. Pulse 130 to 160. Expired on fifth day after accident.

Autopsy by Dr. Bohrod. Strictures as seen at operation. No perforations of esophagus. Esophagitis and erosion. There was a gangrene of post-esophageal tissues extending from base of skull downward into the abdominal cavity. No pus was found here. Gangrenous tissue extended into left pleural cavity where there were about 1½ pints of foul, grayish-yellow pus. Total collapse of left lung. Heart and mediastinal structure were pushed into right chest. A bronchopneumonia and a recent tuberculosis were present in the left lung.

Note: It appears that organisms penetrated the cicatrical tissues of the esophagus where the nutrition had been so markedly interfered with by the pressure of the foreign body. Organisms probably penetrated into the postesophageal tissues and started the gangrene. The bronchopneumonia probably resulted from the aspiration of esophageal secretions which were pouring over into the trachea.

Diagnosis: Gangrenous mediastinitis. Foreign body in lye stricture. Empyema, bronchopneumonia and early tuberculosis.

Case 14. Male, 45 years old, choked while eating steak. Complained of a sticking in lower pharynx on left side and in upper esophagus. X-ray showed obstruction at upper thoracic orifice.

Esophagoscopy: Small abrasion in left pharynx above larynx and a laceration of esophagus at level of upper thoracic orifice. An irregular piece of bone with meat attached (1x1.5x3 cm) was removed.

Course: Discharged on third day. On fifth day a house call was made because patient had chills and some difficulty in moving shoulders. Complained of a deep seated pain in neck and a soreness and fulness throughout chest. During the next eight days the very septic type of temperature and the chills led to a diagnosis of mediastinitis and septicemia. Death occurred on the 15th day after the accident.

Autopsy by Dr. Bohrod. Acute gangrenous periesophagitis, mediastinitis, thrombophlebitis of left internal jugular and left innominate veins, multiple septic infarcts in lung, septic infarcts in spleen and kidney and acute myocardial degeneration.

In a summary of the *locations of the lesions* observed, 8 out of 11 abrasions were in the cervical esophagus and upper thoracic orifice. Of 43 lacerations, 22 were in the cervical esophagus and cricopharyngeus and 23 were at the upper thoracic orifice. The others were at various levels. Complete perforation occurred 3 times in the cervical esophagus and once at the upper thoracic orifice. Of 12 cases of hemorrhage, 8 were at upper thoracic orifice. Of ten cases of stricture, five were at upper thoracic orifice. It is, therefore, evident that the upper thoracic orifice was the site of nearly 40 per cent. of all the lesions.

Symptomatology: It does not seem possible to determine by symptoms alone whether a foreign

body is present and causing them or that the lesions are the cause after the foreign body has passed. The injury itself is more concerned than the foreign body in giving rise to the symptoms. Therefore any persisting symptoms should be investigated.

Ulcer, esophagitis, perforations and mediastinitis give rise to symptoms increasingly severe according to the extent and depth of the involvement. Involvement of the deep cervical glands in the neck may give rise to deep pressure, ache or pains low down in the neck. Swelling of the mediastinal and bronchial glands may give rise to a fullness, a discomfort, an ache or deep pain in the chest. Therefore when such symptoms are complained of, even though history of foreign body may be negative, the esophagus must not be forgotten in a search for their cause.

CONCLUSIONS

1. A knowledge of the anatomical structure and relationship of the esophagus is essential for the interpretation of symptomatology in injuries of the esophagus.
2. Symptomatology increases in severity as the severity of the lesion, i. e., from abrasions to complete perforation and mediastinitis.
3. In this series, nearly 40 per cent. of the lesions were found at the upper thoracic orifice.
4. Vomiting of acid gastric juices complicates cases of injury to the esophagus.
5. Blind bougienage and forceful ramming of foreign bodies is again to be condemned. It may be successful in many cases but will cause a fatal outcome sooner or later.
6. All cases of persisting esophageal symptoms should require careful study by the x-ray and the esophagoscope.

Jefferson Bldg.

DISCUSSION

Dr. Wm. A. McNichols, Dixon: I wish to congratulate Dr. Sneller on his presentation of this very interesting subject. Dr. Jackson in his book, "Bronchoscopy and Esophagoscopy," devotes a half page to injuries to the esophagus. Yet we know that he has case records of such cases that would fill volumes.

I wish to show two slides demonstrating two types of injuries to the esophagus. The first shows a quarter in a baby's esophagus lodged just below the cricopharyngeus muscle. Several years ago a baby was brought into the clinic with a high temperature and a well developed mediastinitis. This child for the last twelve days had complained of difficulty in swallowing. The x-ray showed a foreign body in this characteristic location. Neither family nor the attending physician had suspected a foreign boy. We decided to remove it. This was done and the baby died twenty-four hours later. Just how much the manipulation hastened the death one cannot say. The next slide shows a mediastinitis high up which was caused by an esophagoscope in the hands of an untrained physician. This young girl went to the physician's office complaining of indefinite throat symptoms. He decided to try his newly acquired instruments with the resultant perforation of the esophagus. The patient was sent to the hospital where in spite of proper management the patient died four days after the accident.

I would like to stress two points: First, we must be on the constant watch for foreign bodies in the upper air and food passages; Second, adequate training in the use of the instrumentarium for bronchoscopy and esophagoscopy can so readily be obtained in this country one is not justified in experimenting on humans; further one must keep constantly working at it to perfect his technic.

Dr. Paul Holinger, Chicago: There are many points of interest which have been stressed in this discussion. In the first place, the question of *degree* of perforation is important when one presents mortality statistics in relation to this disease because we have been taught that complete perforation of the esophagus means mediastinitis and death very quickly. I was gratified to hear that we do not always have fatalities in incomplete perforation, however, and this point is certainly pertinent in view of the statistics.

A number of etiologic factors of esophageal perforation which are of prophylactic significance might be mentioned. In the first place, poorly designed instruments such as esophagoscopes of improper size or shape, the mechanical stricture dilators, and rigid heavy bougies are all dangerous. In the second place the so-called cotton or wool sandwiches or bulk diets given children who have swallowed safety pins make the safety pin problem infinitely more difficult because the pin must be disentangled before it can be safely removed, and perforation may occur during this procedure. Thirdly, there is grave danger in further repeated instrumentation in suspected perforation. It is much safer to wait until the process has localized, and even then it may be best to resort to external drainage.

This introduces the question of therapy in esophageal perforation, and of course the therapeutic procedure is dependent upon whether complete or incomplete perforation is present. Bismuth subnitrate or subcarbonate dry on the tongue following any esophageal trauma aids in coating the mucosal abrasions. In the more extensive lacerations, however, it is of interest to note that in Europe, South and North America there are three separate schools of thought regarding therapy. Doctors Fishman and Lederer recently reviewed the European literature and showed that the Viennese school advised prophylactic mediastinotomy in any case of complete perforation. In South America drainage is attempted through the esophagoscope after the process has localized, while the accepted procedure in this country is to wait until pus is present and then drain exter-

nally through the neck, avoiding further intraesophageal instrumentation.

Dr. George Woodruff, Joliet: Dr. Jackson's book scares you about the danger of perforation and the trauma you can cause with the esophagoscope, which is probably a good thing. Recently I had quite an interesting case, a man who swallowed a needle in some food—how it got there nobody knows. He attempted to pull it out, hooked it over the middle and perforated the hypopharynx, so that the lower part of the needle lay just below the level of the hyoid bone.

I was called and told that this man was coming to see me and we had an x-ray picture which showed thickening of the posterior wall and infiltration, and the needle lay back of the hypopharynx. We thought it might be free in the lumen. I did a hypopharyngoscopy and there was some laceration and bleeding and I stopped and put him to bed. I put him on bismuth and added some calomel and foreign protein and a sterile diet—hoping to build up a reaction against infection. He did quite well, quieted down, and in a few days a mirror laryngoscopy was done. I could see some swelling. I sent him home for ten days, and got another man to look at the case, and neither of us could see any portion of the needle. We concluded that it perforated completely into the neck, posteriorly along the side of the vertebrae. He had some pain around the ear. I sent him home again. A few days later I got a telephone call, later a card, saying that not long after he got home he felt as if the needle had moved. His family doctor was going to send him up, and as they were preparing to do so, he coughed it up. I do not take any credit in this case, except that I did not try to do too much. A sharp needle, if it is high enough up, might penetrate without causing any infection. The character of the foreign body has something to do, apparently, with the danger of mediastinitis.

Dr. H. L. Ford, Champaign: I should like to add that I feel, in any discussion of injury of the esophagus, we should not neglect to mention the blind bougienage which so frequently produces injury. Not infrequently a patient complains of a foreign body, the family doctor passes the stomach tube successfully and tells the patient it has gone on down. I feel that we should mention this to criticize it, and be sure it gets into print in the JOURNAL.

Dr. Charles D. Sneller, Peoria (closing): I want to thank everyone for their kind remarks, particularly Dr. Holinger for adding some points which I intended to incorporate and some which I did not. The subject is really a bigger one than could be discussed in a few hours, especially if a large number of cases are seen. One important point may be brought up. When a case is received which is apparently foreign body, we should study the case carefully and not just rush in with the esophagoscope. Particularly we should wait and find out what is going on, if there is a temperature and any chance of a mediastinitis being present. We will save lives by waiting a little bit. I had two doctors criticise me severely because I went down twice and did not get a foreign body. They went in and got the foreign body, but the patient died. A man 40 years of age, when eating pork steak, got a foreign body lodged in the cervical esophagus. I removed the bone about thirty-six hours later. He went home in two days. I was called on the fifth day; the temperature was 101°; there was pain in the chest. Within three days he was unable to raise the left arm; there was some swelling deep in the neck. On the twelfth day he died. At autopsy there was found a thrombus from one of the pharyngeal vessels, down the jugular into the heart. The interesting thing about this case is that the esophageal incomplete perforation had completely healed. We discovered there had been a small perforation of the hypopharynx on the left side, and that little infection caused this thrombus and the death of the patient. Out of seven cases of true mediastinitis, so far as we could make out, four died and we had three autopsies.

CORRELATION OF CLINICAL TREATMENT OF BURNS WITH RECENT EXPERIMENTAL STUDIES

HENRY N. HARKINS, M. D., PH.D.

CHICAGO

It has been estimated[1] that about six thousand persons lose their lives each year as the result of burns. While this is only one-sixth the number of fatalities due to automobile accidents, the pathology of burns is essentially the same in each case differing only in the extent and depth of the burn, while automobile accidents cause death in a countless number of ways. Hence, a definite therapeutic program can be adopted in the treatment of burns and with so many lives at stake the mode of procedure is a question of vital importance.

Certain recent discussions have advised abandoning the tannic acid treatment of burns and substituting saline dressings or baths. In the belief that this may be a dangerous practice to follow, I have analyzed certain recent experimental work on burns. Davidson[2] originally introduced the tannic acid treatment in the belief that tannic acid would precipitate toxic proteins formed in the burned tissues and prevent their absorption. Some more recent work especially by Underhill[3] and Blalock[4] indicated that there might not be any burn toxin acting at all but that death in burns might be due to loss of blood

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plasma from the blood stream in enormous amounts. The extent of plasma loss was shown by these authors to be about 60% of the plasma normally occurring in the blood. They found a marked state of secondary shock with diminished blood volume in experimental animals. Blalock measured the amount of plasma lost by burning one side of an animal and then bisecting and weighing the two contralateral halves. The writer[5, 6, 7, 8] performed experiments somewhat similar to Blalock, burning only one side of completely anesthetized animals. These animals were placed on a balanced tipping tray connected to a kymograph. As the burned side of the animal became gradually heavier, the increase in weight was recorded on a kymographic tracing. Again the amount of plasma lost into the burned tissues was sufficient to cause secondary shock. While a burned dog's skin does not weep, in human beings there is the added factor of loss of fluid from the weeping burned surface. All of us who have used the tannic acid treatment have noted a white precipitate formed when the tannic acid spray strikes the weeping burned surface. This white precipitate, not unlike that formed when urine is tested for albumin serves as a qualitative test for protein in a burn exudate. In certain of the cases to be reported later in this paper, a quantitative test for protein in the blister fluid shows that it is present in the same concentration as in blood plasma. It stands to reason that the loss of this plasma-like fluid either into the burned tissues or from the burned skin is of much more serious consequence than the loss of a mere transudate. As an example in kind, it is obvious to all of us that while one can urinate 2 to 3 liters a day, the loss of 2 to 3 liters of blood in a day is of quite serious import.

While these authors including Underhill, Blalock, and the writer have shown that plasma-like fluid is lost in burns in quantities sufficient to account for death in many instances, this does not positively rule out the presence of a burn toxin such as was advocated by Bardeen,[9] Davidson[2] and especially Robertson and Boyd.[10] These latter authors reported that extracts of burned skin were quite toxic, but later Underhill,[3] using the same technic, reported that it was the alcohol in Robertson and Boyd's extracts that was the toxic factor. This cast doubt on Robertson and Boyd's toxic theory. However, many reviewers of the subject of burns read only the first article and not the later criticism and have perpetuated the toxic theory in the literature.

Recently, however, certain careful workers have found new evidence for a toxin production in burns. Mason, Paxton and Shoemaker[11] found experimentally that potassium iodide is absorbed as easily from burned as from normal tissues. This gave a new outlook to the subject of absorption of burn toxins as Underhill had previously shown that there is a markedly delayed absorption of strychnine and phenolsulphonephthalein from burned tissues. Blalock[12] gave the toxic theory some credit in a recent discussion stating that: "I believe that deaths which occur from three to ten days following severe burns are due in large part to the absorption of protein decomposition products."

Wilson[13, 14, 15] has had a very extensive clinical and experimental experience with burns. In his capacity as Surgeon to the Children's Hospital in Edinburgh, he has used the tannic acid treatment extensively. In Edinburgh open fireplaces and boiling water on stoves are especially conducive to extensive burns and a large number of these cases are seen every year. Besides popularizing the tannic acid treatment in England, in conjunction with Stewart, Jeffrey and Roxburgh, Wilson has shown experimentally that protein-containing extracts of burned skin are quite toxic. The fluid is toxic when introduced subcutaneously as well as intravenously; toxicity appears as early as six hours and becomes steadily more marked up to forty-eight hours after the burn, and the toxic reaction is not dependent on bacterial toxins. Earlier work done by the writer in association with Wilson[16] showed that a toxin is not demonstrable in protein-free extracts of burned skin.

Blood Concentration in Severe Burns. Irrespective of whether one ascribes to the view that death in severe burns is due to the action of absorbed toxins or to plasma loss into the burned tissues, the fact remains that clinically extensive burns are often accompanied by marked blood concentration. Tappeiner[17] in 1881 was the first to report this finding. One of his patients had a red count of nine million following a severe burn. Locke[18] in 1902 reported ten cases of burns seen at the Massachusetts General Hospital, four of them having a red count of nine million or above. Underhill

in 1923 renewed interest in blood concentration following burns, by reporting instances of hemoglobin percentage as high as 209. McClure and Allen[19] at the Henry Ford Hospital stated that "a blood concentration of 125% is indicative of a dangerous condition and that one of 140 of a condition which is not for long compatible with life." The marked blood concentration in one of our patients with hemoglobin percentage going above 140 followed by recovery is shown in Figure 1.

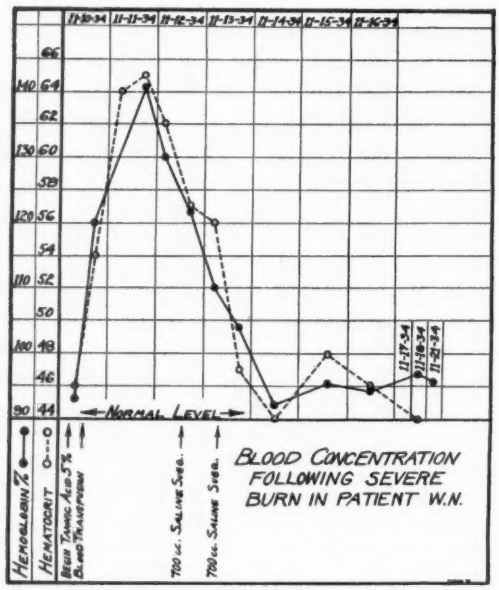

Fig. 1. Blood concentration with recovery in patient W. N., Case 1.

Rational Treatment of Burns. Whether one ascribes to the toxic or the plasma-like fluid loss theory of the causation of secondary shock in burns, two facts stand out: first, that secondary shock is one of the chief causes of death from burns (secondary shock caused 80% of the deaths in Wilson's series) and second, that tannic acid seems to be effective in combating such shock when present. It matters little whether the tannic acid acts by precipitating toxins or by sealing off the capillaries and preventing fluid loss, the important thing is that to the best of our knowledge at the present time tannic acid combats shock and lowers the death rate in burns.

A brief outline of various methods of burn treatment will now be given. These methods can be divided into first, various occlusive dressings, antiseptics, and solutions used usually before the introduction of tannic acid, and second, methods depending on protein precipitation chiefly based on tannic acid itself. The first group includes vaseline dressings, paraffine dressings, carron oil, cod liver oil, sodium bicarbonate, picric acid, butesine picrate, saline dressings or baths, horse serum and cresol and Dakin's solution. The second group can be listed as follows:

PROTEIN PRECIPITANT METHODS OF BURN TREATMENT

A. *Tannic acid preparations:*
   1. Tea (Chinese, 5000 B.C.)
   2. Ink treatment (Jews and Filipinos. Older inks contained considerable tannic and gallic acids, modern inks sometimes are chiefly coal tar products).
   3. 2.5% solution (Davidson, 1925)
   4. 5% solution (Used mostly in U.S.A. at present)
   5. 20% solution (Used in England, Wilson, 1928)
   6. Tannic acid baths (Wells, 1933)
   7. Tannic acid buffered with sodium bicarbonate (Seeger, 1932)
   8. Cutch extract (60% tannin)
   9. Tannic acid plus silver nitrate (produces eschar in about one-fifth the time that tannic acid alone does, Bettman, 1935)
   10. Tannic acid jelly.

B. *Tannic acid plus antiseptic base.*
   1. Acriflavine, 1-100 (Wilson, 1934)
   2. Dettol, 20% (Clark and Cruickshank, 1933)
   3. Bichloride of mercury 1-2000 (Mitchiner, 1933)

C. *Gential violet,* 1% (Said to combine antiseptic properties especially against streptococci with the production of a more pliable eschar than tannic acid, Aldrich and Firor, 1933)

D. *Ferric Chloride,* 5% (Eschar more rapidly formed than by tannic acid and more pliable, Coan, 1935)

Report of Cases. In the past eight years 160 cases of burns have been treated at the University of Chicago Clinics. Since only 3 of these cases died, one would think this a remarkable mortality percentage until it is pointed out that 95 of these cases were treated in the outpatient department often with minor first or second degree burns of the extremities or face usually treated with butesine picrate. Of the remaining 64 hospital cases, in about one-third the burn was only an incidental complaint. These figures are mentioned to point out the error of statistical studies of burns. Even when only cases involving a relatively high percentage of the body

surface are included the depth of the burn must be taken into account. It is not true that depth can be excluded and that only the extent is important, for who of us has not seen a first degree sunburn involving most of the body surface with recovery? Therefore, no statistical analysis of these cases will be made, but ten of them will be quoted to illustrate certain points of interest.

CASES ILLUSTRATING BLOOD CONCENTRATION IN BURNS

Case 1. *Acute extensive third degree burn with marked blood concentration.* W. N., male, aged 4 years, was pushed into a bonfire in the sitting down position on November 10, 1934, and seen by the writer 40 minutes later. On admission there was found an extensive third degree burn of both legs, thighs, and buttocks involving 20% of the body surface as calculated by the Berkow method. Because no grease or other material had been applied tannic acid treatment was immediately begun after washing the burned areas with sterile water. Morphine sulphate, intravenous saline and blood transfusions were given. The blood pressure remained normal, the white blood count averaged from 20,000 to 32,000 during the first senventy-two hours. The red cells showed a marked concentration as shown in Figure 1. Subsequent course included four additional blood transfusions and eight pinch graftings. Complete healing ensued.

Case 2. *Acute extensive third degree burn with slight blood concentration.* W. T., female, aged 4 years, was admitted 12 hours after a third degree burn of almost the entire trunk and part of both arms (28% body surface by Berkow's method of calculation). Butesine picrate was used in another hospital, where the child was given no fluids despite vomiting. She was pulseless and cyanotic on admission to the University of Chicago Clinics. The ointment was washed off, tannic acid applied and two blood transfusions given with recovery after repeated pinch grafting. Twelve hours after the burn, the red count was 7,000,000 hemoglobin 115 and hematocrit 57.

These two cases illustrate blood concentration following burns. Besides the oozing from the burned surface, there was marked visible swelling of the burned tissues.

ANALYSIS OF BLISTER FLUID

Case 3. *Second degree burn. Analysis of blister fluid.* F. T., male aged 26 years, burned his right hand in an alcohol flame just before admission. Extensive blistering was present. Butesine picrate ointment applied with recovery. Analysis of blister fluid: total protein 3.4 grams %, non-protein nitrogen 22.2 mg. %, sugar 58.3 mg. %, and sodium chloride 600.2 mg. %.

Case 4. *Second degree burn. Analysis of blister fluid.* H. T., female, aged 13 years, blister of foot, butesine picrate ointment applied with recovery, analysis of blister fluid: total protein 3.0 grams % and sodium chloride 602.7 mg. %.

The amount of fluid lost into these blisters was not of any consequence. The type of fluid lost is undoubtedly the same in more extensive burns and since this fluid is similar chemically to blood plasma its loss from the blood stream is of more importance than loss of a mere watery transudate. This loss probably accounts for part at least of the blood concentration present in extensive burns. Since the fluid lost is protein containing, the possibility is suggested that in shock due to burns blood transfusion is a more rational mode of therapy than saline infusion.

ESCHAR IN TANNIC ACID TREATMENT OF FRESH BURNS

Case 5. *Thick tannic acid eschar is not always indicative of third degree burn.* T. K., male, aged 2 years, received an extensive scald over the chest and arms to which tannic acid was immediately applied. Although the eschar was apparently as thick as that in Case 1, when it came off two weeks later, good epithelium was present beneath. It does not seem reasonable to assume that the epithelium had grown over such an extensive area in so short a time.

This case illustrates that an eschar can be formed in a severe second degree burn.

Malignancy in Burn Scars. Carcinoma is a well known complication of burns in which epithelization is incomplete and chronic ulceration occurs. The condition is known as Marjolin's ulcer. It may develop in early adult life in cases of burns received in childhood. A little recognized fact is that sarcoma may also develop at the seat of a burn. Keloid is a common late complication but it has not heretofore been reported to undergo sarcomatous degeneration. In the following cases a sarcoma arising in the field of scar resulting from a burn may have been produced by the latter.

Case 6. *Sarcoma in old burn scar.* B. S., female, aged 10 years, was burned on the chest and right breast. Because of keloid formation roentgen therapy and plastic surgery were performed. Seven years later she died of sarcoma of the right breast with internal metastases at the age of 17. Excision of the right breast was performed over a year before death and sections of the tumor showed it to contain spindle cells with numerous mitotic figures growing wildly. Recurrences excised five and seven months later showed the same microscopic picture.

Case 7. *Sarcoma in old burn scar.* A. C., female, aged 67 years, died of sarcoma developing on the right thigh in the scar of an old burn received at the age of 10. The original burn was third degree, kept the patient in bed 2 years, ulcers were present 10 years and grafting never was done.

Malignancy such as this rarer type or the more common carcinomas is always to be considered.

Roentgen therapy may have been an added factor in Case 6. Because of these malignancies, the necessity for a clean plastic result is brought to attention.

Grafting of Old Unhealed Burns and Importance of Blood Transfusion Before Grafting. The relation of the general condition of the patient to the taking of skin grafts has been emphasized in the past, but only too often is forgotten. A good dictum to follow is never to graft until the hemoglobin has been brought above 70% by blood transfusions. Even in children where general anesthesia is used for grafting, infiltration of novocaine containing a small amount of adrenalin beneath the donor site prevents a further loss of blood. Another point in skin grafting too often neglected is to remember that all burn granulations are infected. A separate set of instruments should be used on the granulating area and another on the donor site to prevent transfer of bacteria from the former to the latter. If silver foil is applied directly to the donor site at the close of the operation and the dressing not disturbed for ten days, the donor areas will be found epithelialized entirely, in the majority of cases. In cases where attention is not paid to this important aseptic precaution, I have seen the original granulating area long since healed while the donor area is discharging pus as long as four months after the original grafting.

Case 8. *Granulating area first seen eight months after burn.* C. C., male, aged 5 years, had 14% of the body surface burned on the left leg on March 16, 1934. The granulating area was not grafted and a contracture developed so that when first seen by me on November 11, 1934, he was in a markedly deformed condition. Nine blood transfusions and ten Thiersch and pinch graftings were made with recovery. At one stage in the grafting it was noted that the grafts did not take well. The hemoglobin at this time was found to be 42. Subsequent blood transfusions restored the blood to a normal level and the grafts then took better.

DEATH FROM BURNS DUE TO SEPSIS

Case 9. *Second and third degree burn with death from sepsis 7 days later.* L. R., male, aged 44 years, second degree burn of left leg, face, neck, thorax and arms, third degree of hands and forearms following gasoline explosion. Blood concentration 24 hours later; hemoglobin 140% and red count 7,200,000. Treatment with hypodermoclysis of normal salt solution, blood transfusions, and butesine picrate to the burned area. Pyarthrosis of the left knee, due to streptococcus hemolyticus was noted on the seventh day with a fever of 106.6° F and subsequent death. Necropsy was refused.

Case 10. *Second and third degree burn with death from sepsis and Curling's ulcer 11 days later.* D. M., female, aged 4 years, fell into a hot bathtub receiving second and third degree scalds of the thighs, legs, buttocks, arms, one-half of the back and almost the entire trunk anteriorly. Vaseline dressings were applied and she died 11 days later. Before death she developed a peritonsillar abscess and thrombosis of the veins of the right arm. The temperature rose above 104° F each of the last six days of life. The chief point of interest shown by the necropsy was a penetrating ulcer of the posterior portion of the duodenum 5 cm. below the pylorus. The ulcer was 1 cm. in diameter, penetrated the muscular layer and its base was formed by a thin layer of fibrous tissue. This was diagnosed as a typical Curling's ulcer.

Of the three deaths in the series, that in one instance was not directly connected with the burn being due to a chest wound infection following removal of a broken hypodermoclysis needle with secondary empyema on the same side. In the other two cases as well sepsis was the chief factor in exitus. Neither of them received tannic acid treatment. Duodenal ulcer following burns has often been reported in the literature, the first descriptions being by Long[20] in 1840 and Curling[21] in 1842. In our case the ulcer may well have been on an infectious basis similar to the peritonsillar abscess in the same patient.

Comment. A review of experiments on burns and a study of extensively burned patients indicate the probable merit of the tannic acid therapy. Severe burns are prone to develop shock and whether this be due to toxins or fluid loss, a protein precipitating agent will theoretically be of advantage. In old granulating surfaces due to burns, tannic acid has no rôle and this latter type of patient is most often seen by plastic surgeons. Their adoption of saline dressings as the chief mode of treatment preliminary to grafting should not serve as a standard for those of us who as general practitioners or surgeons see burns early and in their fresh state. For fresh burns tannic acid still has an important place in the therapy of extensive burns.

SUMMARY AND CONCLUSIONS

1. Extensive burns are often accompanied by secondary shock and blood concentration. Whether this be due to toxin production or to loss of plasma-like fluid into the burned area, the tannic acid treatment is a logical method of combating such shock.

2. Various methods of applying tannic acid are discussed.

3. Examples are given of certain complications of burns including sarcoma developing in burn cicatrices, and ulcer of the duodenum (Curling's ulcer).

4. Several practical points in skin grafting burned areas are emphasized.

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DISCUSSION

Dr. D. J. Lewis, Springfield: Dr. Harkins has directed our attention to the disturbed physiology found in cutaneous burns and has suggested that treatment should be direced along lines that will correct or counteract that disturbance. It is only thirteen years since Underhill and his group made the first of their many contributions concerning this altered physiology. Many other workers have added their bit of information, so that at the present time we have a fair idea of the changes that have taken place, or are about to take place in our patient. The situation may be summarized as follows: The burned patient presents himself in pain—in varying degrees of shock—with disturbance of the heat regulatory mechanism and with a skin wound that will allow blood plasma hemorrhage and easy entrance of infection.

1. Pain should be immediately relieved by opiates and dressings that stop its origin.

2. Shock is shock in any type of injury, and measures which are effective in treating surgical shock are effective here.

3. The disturbance of body heat regulation necessitates keeping the air temperature near that of the normal body. This is easily accomplished by the heat cradle.

The loss of blood plasma is best corrected by transfusion and the giving of relatively large quantities of physiological saline or Ringer's solution. The blood hemoglobin per cent. is a good indicator of the degree to which blood concentration is taking place.

4. The skin wound should have all definitely dead tissue removed and some escharotic solution applied. As Dr. Harkins has said, there are many such solutions available and each solution or method of forming an eschar has a champion. They all really accomplish the same purpose, that is, they convert the remaining dead tissue into a protective membrane that tends to minimize blood serum loss and stops pain. This membrane is not a suitable culture medium for bacteria and infection is prevented or delayed. Finally, we now use early skin grafting to hasten recovery and prevent impairment of function and deformity.

There has been a lot written about toxic absorption as a cause of the so-called secondary toxemia of burns. Many workers have attempted to demonstrate toxins and poisonous products in the burned tissue. These attempts have usually ended in showing no definite toxin or poison. The essayist, and Wilson of Great Britain, have apparently demonstrated a depressor substance in burned tissue. They still must show that it is absorbed from burned sites in sufficient quantities to cause the secordary toxemia before definite conclusions can be drawn concerning the importance of this finding.

I say this because Underhill's workers found an increased capillary permeability from the blood into the edema fluid of the burn, and a diminished rate of absorption of the dyes from the edema area into the blood. They injected lethal doses of strychnine into the wound and at its periphery and found no symptoms of poisoning in the experimental animals. I believe that Aldrich has advanced a very plausible explanation of the secondary toxemia as an infection that develops rapidly after the first twelve hours in untreated burns. He believes that the eschar treatment of the wound changes good culture media into a bacteriostatic membrane.

Blair and Brown of St. Louis believe that constant saline packs supplemented by hypertonic salt baths, aid in the early restoration of function. They especially

advocate this treatment in burns about flexures and joints. I notice that this week Crile, Jr., of Cleveland, also advocates saline soaks, especially hypertonic solutions. I mention this so that the essayist in his closing remarks can again point out why he considers this a dangerous procedure.

Some recent writers are pointing out the dangers of the improper use of tannic acid and other escharotics. Taylor of Indianapolis last month warned of the danger of tannic acid killing the deeper layer of epidermis when the cornified layers had been removed. This possibility should be thoroughly investigated so that we may know whether these solutions harm the deeper layers of epithelium, since these layers will be called upon to heal the wound. Traub of New York has just this week reported some cases of permanent pigmentation of the skin following the use of iron salts as wet dressings. Ferric chloride has been suggested by Coan as an ideal tanning agent in treating burn wounds.

The morbidity and mortality from the so-called secondary toxemia of burns has been greatly reduced in the last ten years by close attention to correcting disturbed physiology and the eschar treatment of the wound. The percentage of the severely burned who die in primary shock remains about the same now as formerly. James Mason has reported a nice comparison of results before and after the adoption of the tannic acid treatment. He showed that this method of treatment reduced the mortality from secondary toxemia to 50% for adults and 30% for children when a comparison with older methods was made. Hospital confinement averaged one-half the number of days formerly needed for care.

Dr. James K. Stack, Chicago: I would like to mention two things; the first is simply this—that the application of early skin grafts to a large burned surface is not in any way insurance against contracture of that particular surface. If a child has a severe burn of the anterior surface of the neck or axilla, or the cubital space or popliteal space, it does not mean because that area is healed by skin graft that a flexion contracture of that area is going to be prevented, because contractures take place in tissue much deeper than the superficial area of the skin. However, it does mean that subsequent plastic work on this surface will be much easier.

I would like to ask the essayist to discuss Dr. Taylor's recent paper in the Journal of the American Medical Association about the harmful effects of tannic acid on first and second degree burns.

Dr. Henry N. Harkins, Chicago (closing): With regard to the presence of toxins it seems plausible to assume that in many cases in which toxemia has been given credit for causing illness or death in burns, the important factor is really sepsis, as Aldrich has pointed out. In the only fatal cases of burns seen at the University of Chicago, death was from sepsis and occurred seven to ten days after the burn. One of these cases died two days after developing a retropharyngeal abscess. At necropsy, a large 1 cm. diameter ulcer was found in the duodenum, about 5 cm. below the pylorus. It had penetrated the mucosa and muscularis and fibrous tissue formed its base. It conformed to the diagnosis of Curling's ulcer first described by Long in 1840 and two years later by Curling and now called Curling's ulcer.

Favoring the use of saline dressings advocated by plastic surgeons, there is some evidence that tannic acid may interfere with the plastic results. However, in severe burns where the first thing is to bring the patient through the acute illness alive, the plastic result is of only secondary importance and tannic acid, whether it seals off the denuded area and prevents loss of fluid or minimizes the absorption of toxins is of prime value. In smaller burns where the patient is sure to live through the acute stage, saline dressings may be advantageous. As to the danger of using tannic acid on remnants of living skin, I have not observed the condition mentioned, but I do know that in my case with a very extensive second degree burn an eschar did form and when the latter was removed three weeks later the area was entirely covered by epithelium.

INTERPRETATION OF HILUS SHADOWS IN CHEST X-RAYS OF CHILDREN

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Osler once said: "More than any others, radiographers need the salutary lessons of the dead house to correct their visionary interpretations of shadows, particularly those radiating from the roots of the lungs." At the Children's Memorial Hospital during the past ten years post mortem films have been taken of the lungs.[1] At necropsy a careful comparison has been made of the pathology present on the post mortem films as well as on the films taken during life. It is from that experience that the material for this paper has been collected.

The interpretation of roentgenograms depends upon the character of the shadows present upon the film. One must take into consideration the degree of opacity and homogeneousness of the shadows, their position, configuration and extent, as well as their distinctness in outline and relationship to other shadows. Many pathologic changes give shadows of the some opaqueness, etc., and their differentiation can only be obtained by consecutive films, by a knowledge of other laboratory data, and by the history, clinical study and physical examination.

In the interpretation of roentgenograms of the chest the hilar shadows and the linear mark-

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ings receive the greatest attention, because these areas show extremely wide variations, both when normal and when pathological changes are present.

The Hilum. The hilum is made up principally of blood vessels, bronchi, lymph nodes, pleura and of lung tissue. Changes in any of these structures will alter the size, shape and opacity of the hilar shadow.

By a comparison of roentgenograms of excised lungs taken before and after injection of the blood vessels and bronchi with an opaque material it has been found that a large portion of the hilum shadow is made up of blood vessels. These vessels, both arterial and venous, radiate out from the hilum to the periphery of the lungs both laterally and anteriorly and posteriorly. The blood vessels are larger in caliber than the bronchi and are represented by linear shadows of even density due to the fact that they contain blood which is moderately opaque to the x-rays. When these go anteriorly or posteriorly or when they branch in these directions they show up as circular or oval opaque shadows. They are often erroneously interpreted as lymph nodes, calcified areas, or as beading and studding of tubercles. It is characteristic that these blood vessel shadows have smooth borders and that they are larger and more numerous in the hilum and inner thirds of the lung fields and that they always occur along the linear markings, often changing in number and location upon successive films.

The bronchi are tubes filled with air which is non-opaque to the x-rays. As a result the bronchi appear on the roentgenograms as twin thin linear lines separated by a narrow space of decreased density. If the walls of the bronchi are thickened due to infection they will stand out as more noticeable shadows. They radiate out from the hilum as do the blood vessels, and the main bronchi to the various lobes are usually recognizable but they cannot be followed as far peripherally as the vessels. The bronchi that go anteriorly or posteriorly and those that branch in those directions show up on the film as circular or oval areas of decreased density, largest in the hilus and usually situated next to a similar circular area of increased density due to a blood vessel.

Lymph nodes are present in every hilum as well as along the course of the larger bronchi. They are largest in the hilum and become smaller toward the lung periphery. Ordinarily the lymph nodes are not evident in a normal roentgenogram because although they are more opaque than the bronchi they do not produce enough contrast to the blood vessels to become visible. They may become visible if they enlarge sufficiently to extend beyond the hilum or mediastinum shadows. Accompanying this there may also be a pressure atelectasis of aerating tissue, inflammation of the node capsule and fibrous adhesions to adjacent structures so that the lymph nodes become visible by contrast to the lung tissue. Caseation in itself does cause lymph nodes to become visible unless the above conditions are also present but when they contain calcium they are easily recognizable.

There is also some air-bearing lung tissue between the hilum structures and, of course, surrounding it except at the root of the hilum. Because of its position this lung tissue is continually exposed to change. It may become consolidated due to pressure atelectasis of enlarged lymph nodes, or due to spreading infection from the lymph nodes or bronchi, or to direct pulmonary infection. Often permanent fibrosis occurs so that the hilum shadow will never return to its former density and likeness.

The mediastinal shadow must also be taken into consideration when interpreting a hilum shadow because it may undergo changes which not only influence the size, etc., of the hilum shadow but may be so related as to bear directly on a correct diagnosis.

The Normal Hilum. The right hilum is always more visible than the left because the left cardiac shadow overlaps the hilum on that side. Normally there is always a clear space between the lower right hilus and the right heart border which is of great importance in interpretation. As the hilar shadows are made up of a summation of the shadows of the blood vessels, bronchi, lymph nodes and lung tissue, they will vary greatly according to the patient's age because of the scars of various previous infections after the healing of which the structures do not return completely to their previous state. It is for this reason that it is imposible to give a description of a normal hilum that will include all of the variations of normal. In other orders, a normal hilum shadow in a child is different from one seen in older children or young adults and aged people.

The blood vessels themselves undergo slight if any changes during childhood. This is not true of the bronchi and lymph nodes which are affected many times during the frequent respiratory infections of childhood, and especially by measles and pertussis. As a result there may remain a thickening of the bronchial walls causing an increase of opacity. The lymph nodes may become permanently scarred, enlarged and more opaque with thickening and fibrosis of the capsule as well as fibrous adhesions to the adjacent structure. The surrounding pulmonary tissue may undergo atelectasis or fibrosis so that the hilus becomes larger and more opaque.

The normal hilum shadow is situated at the root of the lung and from it radiate large prominent linear shadows going into each lobe of the lung. These are usually heavier to the lower lobes which gives the hilum its largest dimension up and down rather than laterally. The shadow cast is not a homogeneous one but is made up of areas of various degrees of opacity containing in many instances one or more circular areas of increased and decreased density singly or next to each other which are due to vessels and bronchi. The left hilum seems to extend further laterally than the right. The most opaque part of the shadow is usually not against the heart or spinal column but slightly out from it so that especially on the right side there is a clear space between the hilus and the heart border. It is in the appreciation of the degree of the linear shadows and the amount and extent of opacity between them and the extent of the opacity into the lung fields that one arrives at the differentiation between the normal and the pathological changes. If the radiating trunk shadows are evenly distributed to all parts of the lung though they may seem overly large and dense and if the areas between them are relatively clear with no loss of the clear space between the hilum and cardiac border usually a normal hilum is present.

The Hilum of Tuberculosis. Childhood tuberculosis involves not only the pulmonary tissue but there is almost a simultaneous invasion of the draining lymph nodes along the bronchi, and of the hilum and mediastinal lymph nodes. The enlargement of those nodes, with caseation, fibrosis and adhesions and atelectasis of the surrounding lung tissue leads to the formation of a hilum shadow which is fairly characteristic of tuberculosis. The hilar shadow is usually triangular with the base superimposed on the median shadow and the apex reaching into the pulmonary field. This shadow is usually homogenous and fairly regular in outline with definite borders which have a fuzzy appearance. If involving the right side there is a loss of the clear space normally seen between the hilum and cardiac border. If healing is taking place calcification in the hilum may be present or there may be strand-like fibrous bands extending out from it. If there is involvement of the mediastinal lymph nodes, there will be an increase in the width of the mediastinal shadow on that side, which may be represented by a bulging shadow with a fairly definite outline or a straight one with a fuzzy border. The borders of these shadows are not sharply smooth because they are made up of an inflammatory mass with fibrous adhesions between the pleura, pericardium, etc. This serves as a differential point when considering non-inflammatory enlargements.

A calcified area casts a definite shadow which is usually easily recognized. When present in and about the hilum it practically always is of a healing or healed tuberculosis lymph node. It is represented by an area of increased density usually iregular in outline, sharply demarcated from the surrounding shadows and visible even when beneath a rib. At an early age it is rarely a solid shadow, but presents a mottled, flecked or laminated appearance. In children up to ten years of age, it is usually not a perfectly round, circumscribed shadow of even density but contains areas of unequal density in contrast to vascular trunks which are often multiple, largest near the hilum and which are of even density with regularly smooth margins.

Non-Inflammatory Hilum Enlargement. Enlargement of the hilum or mediastinum due to non-inflammatory pathology is not uncommon in children. Conditions frequently encountered are enlargement of the thymus, Hodgkin's disease, leukemia and malignant tumors. The width of the mediastinal shadow may vary in size, depending upon the phase of respiration which affects the height of the diaphragm.

The thymus shadow when present is usually bilateral with convex smooth borders. It extends downward from the clavicles and appears to cap or overlap the heart shadow. When the

width of the mediastinal shadow is greater than twice that of the spine one can assume that it is not within normal limits.

Tumors occurring in the hilum or mediastinum are usually due to metastasis but primary tumors may occur. The ones we have seen were very large, producing rounded shadows of fairly homogenous density which seemed to bulge into or encroach upon the pulmonary fields from the hilum and mediastinum. The borders are generally smooth, convex and unilateral. Only one such shadow may be present but often several similar rounded areas are seen which seem to overlap each other producing a scalloped appearance. When the pulmonary tissue is also involved shadows similar to bronchopneumonia are present.

In lymphosarcoma, Hodgkin's disease and leukemia the hilum and mediastinal lymph nodes practically always become enlarged either unilaterally or bilaterally. Such enlargement will be represented by rounded shadows with smooth borders which extend out into the pulmonary fields from the median shadows. Only a single shadow may be present or several next to each other or overlapping. The shadow is not as large as that present when a tumor is present.

Changes in Hilum Due to Infection. Practically all acute infections of the lower respiratory tract from the bronchitis of the ordinary cold to measles and pertussis show changes in the hilar shadows. There is always some generalized increase in the linear markings involving all the lung fields. With this there is, of course, an accentuation of the trunk shadows in the hilum with an increase of the hilar shadow due to enlargement of the lymph nodes and pressure atelectasis as well as pneumonic consolidation of the lung tissue in these areas. The enlargement is often not regular in outline and may extend more into one lobe of the lung than the others. The area of increased density is mottled due to differences in degrees of opacity and the base is widened and merges irregularly with the median shadow. The lateral margins are also irregular and mottled, fading into the normal pulmonary shadows. There may be an associated bronchopneumonia involving one or more lobes of the lung. It is often impossible to differentiate the above described hilus enlargement from a central pneumonia, tuberculosis, etc., except by consecutive films.

Often a central pneumonia will start in or about the hilum and will be represented by a shadow of fairly even density extending a variable distance into the pulmonary field obliterating the outlines of the hilum shadow itself. The extent of this shadow will depend upon the age of the pneumonic process; if early then it can on subsequent films be seen extending out toward the periphery of the lung.

In chronic infections such as those originating from chronic sinus disease, which is common in childhood, there is a marked increase in the size and density of the trunk shadows radiating out from the hilum. This gives a marked increase in the size of the hilum shadow because in and about the hilum between the trunk shadows the normal fine pulmonary markings are obliterated or increased by the infection so that the normal density of the lung tissue in this region is lost. The density of this type of hilum shadow is not homogeneous but varies due to the heavy bronchial shadows, especially to the lower and upper lobes.

Pronounced changes take place in the hilum shadow when a bronchiectasis is present. The hilum shadow is not only increased in density but is also enlarged with heavy linear markings extending into the involved lung, usually a lower lobe. The linear markings are accentuated because of the thickening of the bronchial walls and infection of the air-bearing tissue adjacent to them. Small areas of decreased density due to sacculations are usually visible, as well as a widening of the linear lines of decreased density demarcating the enlarged bronchial lumen. With this there is hyperplasia of the regional lymph nodes and varying degrees of consolidation of some of the surrounding lung tissue. There is usually some loss of the normal clear space between the hilum and the cardiac shadow. The heart is usually pulled to the affected side.

Emphysema of the lung as found in asthma may produce a decrease of the density of the hilum shadow due to the increase of air in the alveoli. The emphysematous lung may also extend well over part of the mediastinal shadow producing there an overlying visible area of decreased density.

If there is complete collapse of one lobe of the lung this mass will be drawn medially against the hilus where it will show as a dense

shadow of homogeneous density with smooth regular borders.

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DISCUSSION

Dr. O. N. Lindberg, Decatur: The interpretation of hilum shadows has been a frequent source of confusion and its significance often overemphasized. The reason is clearly that in the hilum zones the markings and width of the root lung structures vary with age, individuals and the number and severity of previous infections. While, as Bigler has stated, the normal hilum may not be defined, its general outline roughly corresponds to a butterfly type of structure presenting cornua from which radiate the bronchovascular trunks to the upper and lower parenchymal fields. In the abnormal hilum shadow there is loss of this contour and the recession between the cornua presents a homogeneous type of density which reaches into the middle zone. When the only apparent deviation from normal concerns the width of the hilum structures, a diagnosis of a clinically significant lesion is seldom justified. On the other hand if the hilum shadow appears "wide and soft" the inner zone parenchyma is quite probably involved in a bronchopneumonic process, although, here again it is well to remember that, in children especially, nontuberculous infections involving the lung root are more common than tuberculous lesions involving the structures adjacent to the tracheobronchial lymph node areas, and to which the term "tracheobronchial tuberculosis" is more accurately descriptive than the more obsolete designation of hilum tuberculosis. It should be considered that tuberculous lesions of the childhood type are more definitely tracheobronchial than hilum, per se, or with true parenchymal involvements which are usually basal, or combined lesions.

Joseph K. Calvin (Chicago): I am just going to say a few words about this subject from a pediatric standpoint. I shall not go into the technique of the roentgenological aspect. I do not know whether you realize how much work Dr. Bigler has put into this sort of research. Considering the short time of his presentation and the resume he gave you, it looks as though it were a few days of work. This was accomplished only after years of following cases clinically and studying x-rays taken before and after autopsies.

I was a Cook County intern and resident in pediatrics in the days before Dr. Bigler's work, and inasmuch as chest plates are a very important part of pediatric roentgenology, I was much interested in the subject. We would frequently get reports back such as calcification in the hilus, increased hilus shadows, hilus tuberculosis, enlarged hilus glands, etc. In going back over the reports of those days, one finds the majority of reports were of that nature, particularly calcification. Calcification being more or less pathognomonic of tuberculosis in childhood, naturally the diagnosis of tuberculosis had to be made. We had to accept them because we did not know better.

Since Dr. Bigler's work there has been a distinct change in the x-ray reports at the County Hospital. I am now on the attending staff and have thus had an opportunity to see the same type of chest x-rays and same underlying pathology. We now get a great many x-ray reports of healthy chests. We realize the so-called areas of calcification were really blood vessels looked at obliquely.

Areas of calcification in contradistinction to blood vessels looked at on end, are not homogeneous, round or oval shadows. The outline is irregular. They vary in density. The blood vessel shadows shift in subsequent x-rays because the rays do not catch the same vessel at the same angle each time. The calcified shadows always persist in the same areas on subsequent films, and are considerably more dense. Even if a rib is superimposed on them, the shadow still definitely shows through.

Dr. Bigler mentioned the fact that it takes a pretty large hilus gland to be diagnosed roentgenologically. You can have considerable enlargement of the hilus glands without showing on the x-ray. When one makes a diagnosis of hilus gland enlargement it must be realized that it is a pretty large gland in order to project beyond the normal hilus, and that most of the shadows in the hilus are due to blood vessels and bronchi, with possible peribronchial infiltration when inflammatory processes are present.

Dr. Bigler has emphasized the fact that the primary tuberculous lesions are distinctly unilateral or asymetrical. In bronchial asthma or in pictures obtained following measles and whooping cough or other upper respiratory infections, there is increased hilus density due to peri-bronchial reactions and later fibrosis, but always bilateral, as the infection is diffusely symmetrical, unless a localized pneumonitis is present. In tuberculosis practically always the lesions are unilateral. With a unilateral picture of that sort extending out from the hilus, one has to make the diagnosis between pneumonia or tuberculosis by additional data. The clinical course helps to distinguish them, as does the positive Mantoux reaction in primary childhood tuberculosis.

Without calcification in these unilateral enlargements I do not think one could show that it was tuberculosis any more than pneumonia in a single film, unless positive tuberculosis skin reactions were present, and a lack of leukocytosis or high fever, etc. Subsequent x-rays in a week or two would show the enlarged unilateral shadow of pneumonia resolving, but a tuberculous lesion unchanged.

Realizing these distinct changes in the roentgenological interpretation, these hilus shadows are now more or less an open book, where before they were nothing more than confusion. I can definitely say that change has taken place following Dr. Bigler's investigations.

H. E. Irish (Chicago): Dr. Bigler did not mention one phase of hilus differential shadows that seemed to be worth while. During the last winter we have been seeing about one hundred cases of pneumonia a month in infants under a year. In many of those there have been symptoms of pneumonia with physical signs either absent or else only suggestive in nature. We take

x-ray pictures of these chests routinely and find that we get considerable help from the x-ray picture in the early diagnosis of central pneumonia. The detail appears has a small center spot or area of opacity surrounded by a rounded area of density and corresponds, I believe, to the bronchus, rayed in the long diameter surrounded by the early infiltration of pneumonia immediately surrounding, in other words a peribronchial pneumonia. It appears in the skiagram in what looks like bird's eyes, a little round pupil with an iris of greater density. They occur not very numerously but one may see as many as half a dozen on a side. By watching those areas serially the subsequent pictures usually show extension of the infiltration, usually into one of the lobes of the lungs, a localization peripheral later. This early hilus detail is of very great usefulness in making differential diagnosis in early central pneumonia.

I presume some of the men who deal with x-rays have noticed this before but I can say it is well worth looking for and has been of very great use to us in diagnosing early stages of bronchopneumonia.

Dr. John A. Bigler, Highland Park (in closing): As Dr. Irish said, the roentgenograms of the chest are of considerable help in diagnosing the presence of an inflammatory process. Bronchial pneumonias may start any place in the chest, the periphery area, pulmonary regions or in the hilus. If the pulmonary tissue is beginning to show opaque shadows one knows some pathology is present. If these shadows between the linear trunk markings extend into the pulmonary fields from the hilus, there is unquestionably an inflammatory process present.

KETOSIS IN THE TREATMENT OF EPILEPSY

Effects of Diacetone Alcohol on Institutional Epileptics

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Following the reports of the successful utilization of the ketogenic diet in the treatment of epilepsy an elucidation of its modus operandi has become important. Among the questions to be answered are the following:

1. Is the acidosis accompanying the diet of chief significance?
2. Is the dehydration following the use of the diet the factor involved?
3. Is the loss of fixed base, particularly that of potassium, that follows fasting[1] of importance in the control of the seizures?
4. Is it the anesthetic property[2] of the ketone bodies that causes a diminution in the frequency and severity of the seizure?

In the experiments reported below we have attempted to find an answer to the last question.

Keith[3] has concluded from experiments on rabbits that aceto-acetic acid and its sodium salt and diacetone alcohol have each a pronounced effect in preventing thujone convulsions. The fact that the neutral salt sodium aceto acetate is anticonvulsant shows that it is not due to acid properties of the drug. The anticonvulsive properties depend on the acetone portion of the molecule.[3]

We used diacetone alcohol in our experiments. This substance has the structural formula.

$$\begin{array}{l} \text{C.H.}_3 \\ \text{C.H.}_3 \end{array} \!\!> \text{C} - \text{C.H.} - \text{C} - \text{O.H} \quad \text{C.H.}_3$$

Method: Eleven epileptic patients of whom three were males, were given the diacetone alcohol treatment. They had a history of convulsive seizures for twelve to forty-six years. Their ages ranged from twenty-one to fifty-two years and they had been hospitalized from three to thirteen years. Prior to the present study they had been treated with phenobarbital and at times with sodium bromide. They were given two to six drams of diacetone alcohol daily. The dose varied according to the known severity and frequency of the convulsions and the reaction of the patient to the drug. The patients were observed daily for frequency and character of the convulsions, behavior and gastrointestinal disturbances. Blood pressure, pulse rate and respirations were determined frequently. At weekly or biweekly intervals, laboratory tests were made which included complete blood counts, hemoglobin determinations, blood sugar and non-protein nitrogen. Frequent urinalyses were made.

The drug had to be discontinued on the third day in one case because of severe vomiting. The patient had received two drams of diacetone alcohol daily. She was taken off the treatment. The drug was discontinued in another patient on the twelfth day because she refused to take it and had three convulsions on that day.

The remaining patients who tolerated the

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medicine were under treatment for forty to fifty days and then were observed during a period of twenty-five days when they received no medication at all. After this period, treatment was resumed for about fifty days.

Results: Diacetone alcohol is not anticonvulsant in institutional epilepsy. Most of our patients had from one to ten convulsions a month. Phenobarbital in doses of 1½ to 4½ grains daily rendered five of the patients free of convulsive seizures. In these patients diacetone alcohol was not effective. The remaining patients continued to have seizures when on phenobarbital and also during the period of diacetone alcohol treatment. The frequency and severity of the convulsive seizures in these patients were slightly greater during the twenty-five day period when they received no medication at all, than during the period of treatment. We thought, however, that there was no significant difference in view of the fact that rather severe seizures continued to occur during treatment.

One of the patients died in status epilepticus one week after completion of the diacetone alcohol treatment. She had been on phenobarbital during the week prior to death. This patient had a history of frequent periods of status epilepticus during her stay in the institution. Unfortunately we did not have permission for a postmortem examination to determine whether death was related to the previous treatment with diacetone alcohol. The fact that she died a week after treatment had been discontinued and her history of previous periods of status would indicate that her death was probably not due to the administration of the drug.

The urine in seven patients was positive for acetone and there was no correlation between the number or severity of the seizures and the acetone reaction in the urine. There were no changes in pulse rate, blood pressure, respiration, cellular constituents of the blood, hemoglobin and non-protein nitrogen. The blood sugar, however, was increased in four patients and lowered in one as shown in Table 1. We used the Benedict[4] modification of the Folin—Wu method. The normal values by this method lie between 70-100 Mg. per 100 c.c. of blood. It will be noted that all of the patients tested except one (90) had blood sugar levels below or at the lower limits of normal. In cases 1, 2, 7 and 8 there was a significant increase in blood sugar after the diacetone alcohol treatment. All of these patients had acetone in the urine.

In order to ascertain the relation of the administration of diacetone alcohol to blood sugar we investigated the problem in a series of six rabbits. After a sample of blood was withdrawn by heart puncture, 0.3 c.c. per kilogram of diacetone alcohol was injected in the marginal ear vein and blood samples were removed by heart puncture at fifteen minute intervals for a half hour and then at half hour intervals, until six or seven samples were obtained. (We had previously found that 0.5 c.c. per kilogram caused profound stupor confirming the results of Walton, Kehr and Loevenhart[5]). On previous days similar procedures were carried out on each of these rabbits; on one day withdrawing blood samples after the intravenous injections of normal saline and on another day withdrawing the samples when nothing at all had been injected.

TABLE I.

CHANGES IN BLOOD SUGAR AFTER THIRD WEEK OF TREATMENT WITH DIACETONE ALCOHOL

Case	Before Treatment (Blood Sugar in Mg. per 100 cc.)	After Treatment (Blood Sugar in Mg. per 100 cc.)
1	72.72	110.49
2	59.1	101.52
3	83.33	80.6
4	90.09	75.0
5	78.50	80.0
6	85.10	86.58
7	60.10	93.02
8	62.50	81.63
9	72.72	75.47
10	67.12	64.51

TABLE 2.

BLOOD SUGAR AFTER INJECTION OF DIACETONE ALCOHOL. RABBIT No. 2 (3 Kg.)

Time	Blood Sugar Mg. per 100 c.c. of blood
8:45 A. M.	133.3
8:50 A. M.	0.9 c.c. diacetone alcohol injected intravenously.
9:05 A. M.	137.9
9:20 A. M.	133.3
9:50 A. M.	134.3
10:20 A. M.	134.2
10:50 A. M.	148.1
11:20 A. M.	160.
11:50 A. M.	200.0

TABLE 3.

BLOOD SUGAR OF RABBIT No. 2, ON DAY BEFORE INJECTION OF DIACETONE ALCOHOL

Time	Blood Sugar Mg. per 100 c.c. blood
10:10 A. M.	137.9
10:25 A. M.	133.3
10:40 A. M.	132.4
11:20 A. M.	132.4
11:50 A. M.	132.4

The three series of blood sugars in each rabbit were compared and it was found that diacetone alcohol caused a definite rise in blood sugar which did not occur after saline injections or after no injections. Female rabbits, one of whom was pregnant, were found to be unreliable for these experiments as the blood sugar would vary considerably even when no medication was administered. With the exception of the female rabbits, the blood sugar varies very little for a period of two hours after saline injection or under no medication. The average change in blood sugar after the administration of diacetone alcohol was from a basal level of 113.3 to 169.0. There was a steady rise in blood sugar the peak occurring two hours after the injection. After that there was a tendency for the blood sugar to return to the basal level. An experiment in which there was a high basal blood sugar and in which the increase due to diacetone alcohol did not return to the basal level is chartered below. (Table 2). This is to be compared with the normal blood sugar levels. (Table 3.)

Comment: Our findings indicate definitely that diacetone alcohol is of no value in the treatment of epilepsy. This is opposite to Keith's[3] findings of the unquestionable anticonvulsive properties of diacetone alcohol in thujone convulsions of rabbits. In the rabbit experiments, however, the concentration of the acetone body in the blood is probably at its greatest when a thujone convulsion is about to "break through." This is possible in experimentally induced convulsions where the anticonvulsant and the convulsant drugs can be administered within a short time of each other. In human epilepsy the concentration of the ketone body might be insufficient at the time a convulsive seizure is imminent due to the rapid excretion of the ketones. This is analagous to the conditions present in the bromide treatment of epilepsy. A definite blood bromide level for each individual epileptic is required to prevent seizures[6]. It is possible that the ketogenic diet is more efficacious in maintaining a definite ketone level in the blood than with the administration of ketone bodies as such.

An argument against our conclusion, which is based on treatment of institutional epileptics may be cited in the work of Notkin[7] who reported that the ketogenic diet is of no value in institutionalized epilepsy. However, if the effect of the ketogenic diet were due to the sedative properties of the ketones, it would seem to be a clumsy, complex, uncomfortable and uncontrollable method to obtain sedation when the use of bromides with the simple control by the blood bromide level yields good results.[6]

It seems to us, however, that the good results obtained with the ketogenic diet in children is due to the fact that responses of the body to the diet are similar to those in fasting though not to as great an extent. During fasting as well as during a strongly ketogenic diet[1, 8] there is a loss of intracellular water and fixed base incident to the excretion of excessive amounts of acid formed. Gamble, Ross and Tisdall[1] state that the cells give up potassium when either protein or glycogen is destroyed. By this means the proportion of water and salts to solids in the cell could be kept relatively constant. The failure of the ketogenic diet in certain patients is due to the fact that the degree of acidosis which results from ketosis will depend not only upon the quantitative production of ketones, but also upon the rate at which they are excreted, the amount of base which is available for their neutralization and the efficiency of the factors involved in the maintenance of neutrality, especially the ability to substitute ammonia for fixed base.

That ketosis in itself is not sufficient to prevent convulsions is brought out by McQuarrie[8] who found that a marked increase in ketosis did not have any anticonvulsive effect in the presence of alkalosis. He has also found that a non-ketogenic diet with a high content of acid forming elements did not have any inhibitory influence on the convulsions. Although Talbot, Metcalf and Moriarty[9] attribute the beneficial effects of fasting or the ketogenic diet to acidosis the production of ketone bodies being of minor importance, Peterman[10] in 1925, said that acidosis or ketosis alone do not control the convulsions and that ketosis and acidosis should be distinguished. Only during ketosis and acidosis an inhibitory effect on the convulsions occurs and this may be due to the similarity of the effects observed in starvation with the resulting excretion of fixed base. The shifting of potassium and intracellular water across the cell membrane may be the mechanism involved in the inhibition of convulsions.

We noted that the basal blood sugar level in

our patients was below that or at the lower limits of normal. This is in agreement with the reports of many observers. Tyson, Otis and Joyce,[11] found sub-normal fasting blood sugar levels in 56.4% of a group of 92 epileptics as compared with only 12.5% of the non-epileptic control group. They found a correlation between the abnormal glucose tolerance and the frequency of seizures experienced by these patients both during the test and during the patient's institutional life. Nielsen,[12] in a series of 58 consecutive dextrose tolerance curves showed that periodic or constant low blood sugar occurs in about 90% of epileptic persons during a dextrose tolerance test. He also finds in a series of 182 consecutive dextrose tolerance tests on various clinical entities that idiopathic epilepsy seems nearly confined to persons with a tendency to hypoglycemia.

The administration of diacetone alcohol caused a rise in blood sugar in four of our patients. The causal relation of the hyperglycemia to the administration of diacetone alcohol was confirmed by experiments on rabbits. The mechanism involved is probably an inhibition of insulin secretion. The patients were on the regular institutional diet with sufficient carbohydrate. There was thus sufficient glucose available for an increased mobilization of glucose to oxidize the ketone body according to the principle that the acetone bodies require glucose for complete oxidation. Nevertheless, there was a considerable excretion of acetone in the urine of these patients in the presence of a hyperglycemia. This indicates a suppression of insulin activity. The finding of hyperglycemia after diacetone alcohol medication is opposite to the state of the blood sugar level during the administration of the ketogenic diet. During the ketogenic diet associated with acetone production there is a diminution of the amount of sugar found in the blood[9]. The explanation of the difference in the blood sugar concentration during the ketogenic diet and during treatment with diacetone alcohol is obviously based on the fact that with the ketogenic diet there is very little carbohydrate available, whereas the diacetone alcohol treatment was accompanied by the usual diet with sufficient carbohydrate.

The suppression of insulin action by diacetone alcohol is of interest in relation to epilepsy in view of the reports of Harris[13] of hyperinsulinism and the resulting hypoglycemia that is associated with convulsions similar to epileptiform seizures. It is also of interest to ascertain the relation that the inhibition of insulin activity by diacetone alcohol has on the prevention of thujone convulsions.

SUMMARY

In order to determine whether the acetone bodies developed in the course of the ketogenic diet are the factors that inhibit epileptic convulsions, we treated eleven institutional epileptic patients with diacetone alcohol. The anticonvulsant properties of this drug were demonstrated by the experiments of Keith. Two to six drams of the drug were given daily during two periods of treatment. The first period was from forty to fifty days and the last period was fifty days. There was an intervening period of twenty-five days during which no medication was given. It was found that diacetone alcohol was not anticonvulsant in institutional epileptics. The urine in seven patients was positive for acetone and there was no correlation between the number and severity of the seizures and the acetone reaction in the urine. The blood sugar was increased in four patients and lowered in one. Diacetone alcohol was injected intravenously into six rabbits in order to ascertain the relation of this drug to blood sugar. It was found that there was a definite increase in the blood sugar level following the administration of this drug.

The reason for the discrepancy in the action of diacetone alcohol in human epilepsy in which it is not efficacious and in the thujone convulsions in rabbits where it is definitely anti-convulsant is probably due to a failure of obtaining a sufficiently high ketone blood level in human epilepsy at the time a convulsive seizure is imminent. The ketogenic diet may be more efficacious in maintaining a high ketone blood level than the administration of the ketone bodies as such. However, it is more likely that the results obtained with the ketogenic diet are due to the shifting of intracellular fluid and potassium across the cell membrane that accompanies a strongly ketogenic diet.

The rise in blood sugar caused by diacetone alcohol is due to an inhibition of insulin activity which this drug probably causes.

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DISCUSSION

Dr. T. T. Stone, Chicago: I think at this time it would be extremely practical if we inventory rather briefly the story of the convulsive state in discussing this particular type of research in epilepsy. As you all know, when any disease or symptom is periodic in nature, any type of therapy leveled at that particular disease or symptom is rather difficult to evaluate.

It would be interesting to discuss briefly what we understand by epilepsy. What is epilepsy, the pathogenesis particularly? It has been thought for many years that epilepsy is probably due to an abnormal process in the brain. It has also been thought to be due to some altered metabolism of constitutional origin manifesting itself by humoral instability, which means a lowered threshold for convulsions.

In this discussion I will confine myself to the latter aspect of the problem, because I do not think Dr. Finkelman had in mind any question of organic brain disease.

For many years it has been impossible to determine what this humoral factor is or was. In the past twenty years there have been great advances in the laboratory relating to physiological, chemical and biological processes. At this time one may review the various types of treatment that have been leveled at epilepsy in the years that epilepsy has been known. They are: Sedatives such as sodium bromide and luminal, lowered salt in the diet, a lowered protein diet, a ketogenic diet, chemical ketosis, acidosis, dehydration, inanition, and potassium boro-tartrate. This discussion will be confined to that of the ketosis.

What is a ketosis? A ketosis is a state of the organism in which one finds incomplete fat metabolism associated with the production of ketone bodies such as acetone, diacetic acid and B-oxybutyric acid. Further, there is a definite acid-base change so that the potassium ion within the cell has decreased in amount and the chloride ion outside of the cell has increased. There also results a state of acidosis in which examination of the blood has proved it to be not more acid but less alkaline than normally.

When does acidosis occur? Acidosis most commonly occurs in diabetes mellitus. You can produce it by starving yourself. You can produce it by severe exercise. You can get it in infections and in ether anesthesia.

What is it supposed to do? Ketosis is supposed to diminish or arrest convulsive seizures in adults and children. It is supposed to do it by one of several methods. I, personally, do not know how it does it. It is supposed to be due, possibly, to either the specific acetone effect or the effect of diacetic acid on the nervous cells. It may be due to the production of an acidosis, and it may be due to the change in the Ph or the acid-base, and finally—and I believe this last reason may have some basis for future work—dehydration.

What suggested the utilization of a ketotic regime in the treatment of epilepsy? Everybody knows that in true diabetes mellitus, in which ketone bodies are found in large quantities, one very rarely, if ever, sees epilepsy. Joslyn, in 5091 cases of true diabetes, did not observe a case of co-existing epilpsy on even one occasion.

It was thought that this being the case it would be ideal for the treatment of epilepsy to adopt those bodies or those substances found in diabetic states, and that explains the use of ketone bodies.

As Dr. Finkelman said, it is impossible to use acetone or diacetic acid or B-oxybutyric acid because of their strength and unfavorable reaction on the human body.

In summing up, let me say in our experience, existing over a period of eight years with the ketogenic diet in adults, we have found it to be of practcically no assistance. We have not been able to arrest convulsive seizures completely in any adult patient by the giving of a ketogenic diet alone.

I am not at all surprised to hear today that the use of diacetone alcohol in convulsions occurring in adult institutional epileptics has been found to be of no value. If some sedative is given in conjunction with the ketogenic diet, one is unable to designate this as a critical experiment.

The present treatment, in my estimation, of cryptogenic or genuine epilepsy should be that of giving intelligently, properly and constantly, over a period of three or four years, some sedative like sodium bromide or luminal. There should be a careful re-investigation and re-examination every two to three months to determine whether that patient is getting sufficient medication to keep him convulsion-free, and if not, the sedative increased to such an amount as to result in a convulsion-free period. If, at the end of three or four

years following the last convulsion, the patient has no spells, I think one can say that that patient is cured.

Do not misunderstand me. I do not think one can cure cryptogenic or idiopathic epilepsy, but for our purposes of relation to the laymen, if you can keep them free from all seizures for three or four years after the last convulsion, you may then take them off all medication.

Patients who have epilepsy should be forbidden from driving cars, swimming or climbing to any heights. They should be allowed to participate in all forms of exercise except those that require an unusual amount of exertion. They should refrain from marriage.

Dr. Isidore Finkelman, Elgin (in closing): I just wish to say a few words. The paper seemed to be of such technical interest that the general practitioner goes away without, perhaps, any value with the exception of the very practical points brought out by Dr. Stone.

I wish to add that the last statement Dr. Stone made is very applicable to the story that Temple Fay told in Kansas City at a meeting of the Society for the Study of Epilepsy. As he was driving along to Kansas City, another man drove by and almost ran him in the ditch. Miraculously Temple Fay escaped. He looked at the driver who was driving that way and thought he had a mild epileptic spell. His eyes rolled up and he had a blank facial expression and he had all the other signs of an epileptic spell.

I wish to add that I think it is rather important for your epileptic patients to be active, to have exercise. Do not tell your epileptics to rest. If they are not occupied with anything they will have more convulsions.

Another practical point is that when you give your patients bromides it is a wise thing to add Fowler's solution, one to two minims in each dose. This counteracts some of the toxic effects of the bromides.

Question: Do you give diacetone alcohol intravenously?

Dr. Finkelman: by mouth.

185 N. Wabash Ave.

EPIDEMIC RESPIRATORY DISEASES IN EARLY LIFE

A Clinical Study. Preliminary Report

SCOTT J. WILKINSON, M. D.

DECATUR, ILLINOIS

The definition of the term epidemic respiratory disease, as used here, is of more theoretical than practical importance. In conformity with common usage, the diagnosis has been applied to those infections, prevalent during cold weather, with primary or predominant localization in the upper respiratory tract. Current opinion among investigators attributes these diseases to the pathogenic action of a virus, such as cold or influenza, generally associated with ordinary bacteria implicated as secondary invaders. The latter, H. influenza, streptococci and pneumococci, for example, are held responsible for the frequent complications of acute respiratory diseases. In the illness of the individual patient, clinical recognition of the presence and type of of virus, and potential or actual secondary invader, is generally impossible. The variable and puzzling behavior of patients with respiratory disease during different epidemics, as well as the individual variations in the same epidemic, prompted the clinical study reported here. The very fact that influenza can ordinarily be identified and diagnosed with certainty only in epidemic outbreaks is sufficient reason for a group study of the epidemic features of acute respiratory diseases. The acknowledged importance of these diseases as a cause of illness and disability at all ages needs no emphasis, although the greater frequency and increased severity of these infections during early years makes the problem particularly significant in pediatric practice. From the viewpoint of relative importance to other diseases, it is interesting to compare the observed incidence of certain contagious diseases to acute respiratory infections. During the five year period reviewed here, the number of children treated showed the following ratio of diseases:

Scarlet Fever	1
Measles	10
Pertussis	20
Epidemic Respiratory	165

The material for the present study of epidemic respiratory diseases in early life was obtained from case histories of private patients for the years 1931 to 1935, inclusive. During this period satisfactory records were available in 475 children for a total of 827 illnesses diagnosed acute respiratory infection. The data studied included age at onset, complaints, usually as given by the parent, physical findings, duration of illness, and complications. These findings were tabulated chronologically for the five year period. The average findings over this time should be typical of acute respiratory disease in infants and children for this locality. Since the cases studied are a selective group, the method is distinctly one of "sampling." The data in regard to severity of attacks and incidence of complications are probably more favorable than would be found in the entire community, since private patients as

Read before Section on Public Health and Hygiene, Illinois State Medical Society, Springfield, May 19, 1936.

a group are undoubtedly attended more closely by families better able to provide for their children. The present data obviously is not a continuous nor inclusive record of all respiratory infections in these patients, since milder attacks unquestionably are never seen, and the composition of the group to a certain extent is constantly changing. For various reasons the available cases are also heavily weighed towards the earliest age period. The epidemic character of the recorded illnesses is naturally influenced by the size of the community involved, a city of approximately 60,000.

The epidemic type and distribution of respiratory diseases noted during the five year period are illustrated by the accompanying chart where cases have been plotted by monthly totals. (Chart 1.) Graphically there appears a rather constant low level of cases throughout the curve. Cases within this continuous level have been arbitrarily separated on the graph as "endemic" disease, in contrast to groupings above the line representing various epidemics. Practically, there are no distinctions for these so-called "endemic" cases and they have been included with the epidemic group in later studies. With this chronological graph of the present group of cases, another graph of obvious significance has been included. The upper curve represents generalized influenza epidemics recorded by the U. S. Public Health Service from 1931 to August, 1935.[1] This curve, derived from excess mortality rates from influenza and pneumonia over normal expectancy, has been copied here as an average of the curves reported for the East and West North Central States, the section of this study. The two curves have been drawn in approximate proportions for maximum peaks. The chronological correspondence of certain peaks in the two curves, together with the relative similarity of these peaks, clearly indicate that these particular epidemics in infants and children were influenzal infections, or diseases initiated by epidemic influenza. For later study these epidemics have been numbered influenza 1, 2, 3 and 4. Ideal data for study of epidemic respiratory disease should provide a similar explanation for each individual epidemic. Although this is not possible with the present group, attention is directed to one other group of epidemics which occur during the months of July to October, inclusive. These epidemics, indicated on the chart by vertical shadings, involve diseases distinctly different from the winter type. These differences will be pointed out later with the clinical data recorded for the various epidemics.

Before considering the average features of these respiratory diseases and the individual variability of these features in different epidemics, certain general trends of these illnesses in early life are worth noting. Reference was made to the fact that respiratory infections at this age are much more severe than in later life. This relative severity is partially indicated by the degree of fever, although elevations of temperature are more extreme in early life. For all attacks the average recorded temperature ranged up to 102 degrees in 63% of the patients, over 102 in 37%. Since four hour temperature records were exceptional, the percentage over 102 is probably underestimated.

The severity of these illnesses is also reflected in the following figures for average duration of illness in all attacks during the five year period:

Duration 1 to 3 days	26%
Duration 3 to 7 days	35%
Duration over 7 days	39%

Since the uncomplicated cold and attack of influenza is considered to be an illness of approximately three days' duration, it appears that about 75% of this group had a more serious or complicated disease. The effects of these severe infections of early life are indicated by the number of complications. The five year average for this group showed:

Otitis Media	5.9 %
Adenitis	2.9 %
Pneumonia	4.2 %
All others	1— %
Total	14—%

It will be noted later that different epidemics have marked variations, both as to incidence and type of complications. The present percentages, if anything, underestimate complications, since questionable or mild disease, such as otitis media not progressing to drainage, relatively minor degrees of cervical adenitis, and doubtful pulmonary involvement have not been included as complications. Clinical experience with pulmonary complications, during epidemics especially, shows that many cases, not diagnosed in

1. Influenza and Pneumonia Mortality in a Group of about 95 cities in the United States during four minor epidemics, 1930—1935. Collins, S. D., and Gover, M.: Public Health Reports 50: 1668-1689, Nov. 29, 1935.

the absence of unnecessary x-ray study, have changes in the lungs with insufficient physical signs to justify a clinical diagnosis of bronchopulmonary disease. While figures for comparison with older ages are not available, clinical experience with epidemic illness in the families of these children uniformly reveal more serious illnesses in the early age group. In respect to age, however, the present group also illustrates anfection should be at a minimum. While this is comparatively true, isolation alone would appear to be an inadequate explanation for the absence of disease, since epidemic influenza of all ages appearing simultaneously in all parts of the country involved the present group. This speaks for a diversity of infection so extensive both as to locality and age that escape from exposure of any age group seems most unlikely. The second

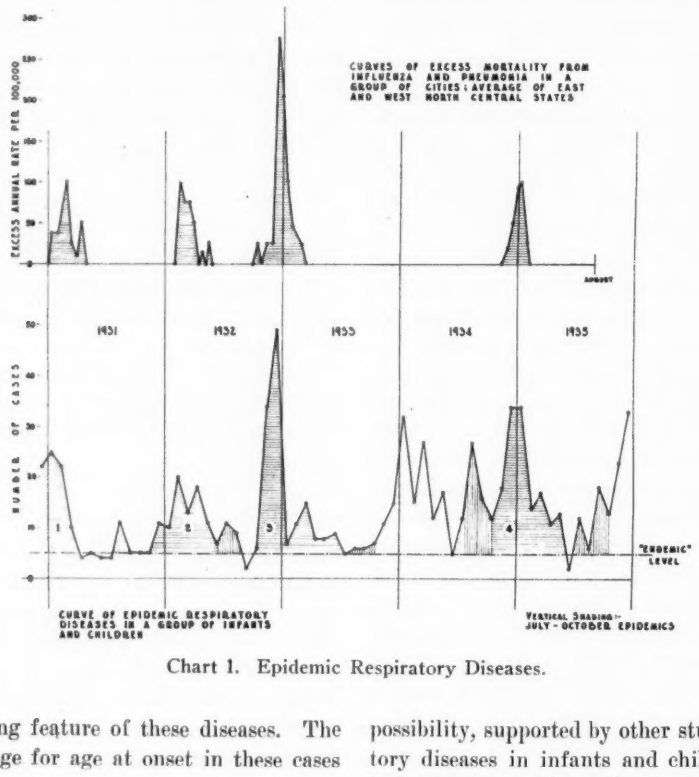
CURVES OF EXCESS MORTALITY FROM INFLUENZA AND PNEUMONIA IN A GROUP OF CITIES: AVERAGE OF EAST AND WEST NORTH CENTRAL STATES
EXCESS ANNUAL RATE PER 100,000
1931
1932
1933
1934
1935
NUMBER OF CASES
"EPIDEMIC" LEVEL
CURVE OF EPIDEMIC RESPIRATORY DISEASES IN A GROUP OF INFANTS AND CHILDREN
VERTICAL SHADING = JULY - OCTOBER EPIDEMICS

Chart 1. Epidemic Respiratory Diseases.

other interesting feature of these diseases. The five year average for age at onset in these cases is as follows:

0 to 6 mos.	4.7%
6 to 12 mos.	12.5%
1 to 2 yrs.	20. %
2 to 6 yrs.	40. %
Over 6 yrs.	16. %

These figures show that the incidence of infection is low during the first few months of life, but increases progressively in the first two years. This recorded variation with age is more significant when it is recalled that the present group predominates in infants and young children. For such a relative freedom from illness in earliest infancy, two possible explanations might be suggested. In the first place, the early months of life are a protected period when exposure to in-

possibility, supported by other studies of respiratory diseases in infants and children, is that a temporary immunity following birth counteracts infection during the first few months of life. In confirmation of such a transient, relative immunity, clinical observations not included in the present study might be mentioned. The youngest infants under care during these epidemics usually suffer mild, brief upsets in contrast to the more severe and prolonged illnesses occurring simultaneously in children of slightly older ages. Exceptions to this rule naturally occur, but these variations with age are especially noteworthy when, in families of several children with multiple cases of illness, infants of the first few months are repeatedly seen to escape serious sickness.

Because of such individual variations in reac-

tion to identical infections, the general type of disease prevalent in these epidemics must be studied in group figures. This approach is in no way peculiar to respiratory diseases. For this reason the clinical findings in the present group of epidemic infections have been recorded in percentages in the following table.

TABLE 1

CLINICAL DATA OF ACUTE RESPIRATORY DISEASES IN A GROUP OF INFANTS AND CHILDREN

COMPLAINTS:	Percentage incidence of all cases over a period of five years	Noteworthy variations from 5 year average in— Influenza Epidemics No. 2 Spring 1932	No. 3 Winter 1932	No. 4 Winter 1934-35	Non-influenzal Winter 1935 July-Oct.,	Periods of July-October 1931-35 inclusive
Cold	61					30
Cough	49		61	69		18
Anorexia	37		28		56	
Abdominal pain	11		7	6.4	25	15
Vomiting	21	27	14	14	37	28
Diarrhea	5.7		2.4			:3
Irritability	19				7.3	
Listlessness	22	35			31	
Aching	12.5		18		15	17
Earache	7.2	0	11	12	20	1—
PHYSICAL FINDINGS:						
Pallor	6.1				12	
Coryza	37	62	47		20	23
Pharyngotonsilitis	63	40	75		53	
Adenitis	30	21	18	22	51	40
Otitis Media	16		32	22	23	5
Tracheitis	5.3		9.6		7.3	
Bronchitis	8		5	10.7	15	4
Pneumonia	4	0	6	8.6	7.3	
Laryngitis	8.7		3.6	5.4	4.4	6.6
Asthma	4		11		1.5	2
DURATION:						
1 to 3 days	26				9	46
3 to 7 days	35					27
Over 7 days	39				60	25
COMPLICATIONS:						
Otitis Media	6		11	3	13	1—
Adenitis	3	0	3.6	0	4.4	3.8
Pneumonia	4	0		6.4	6	2
Additional	1—	0	0	0		0
Total complications	14	4	20	9.6	25	6.6

Increased rates in heavy figures.

Table 1—Epidemic Respiratory Diseases.
Wilkinson, Scott J.

It is realized, of course, that these percentages have no exact value, especially in the smaller groups. Marked variations in findings recorded by a single observer, however, should have a definite value in contrasting variable features of different epidemics. The present table lists all findings in percentages for the five year average of all attacks, together with scattered data in separate epidemics where the percentages varied significantly from the five year averages. The blank spaces may be assumed to vary less than 20% from the five year averages. Allowances must obviously be made for the various findings according to their character. The incidence of otitis media, for example, as indicated under the symptom of earache, is inaccurate in a group containing infants. As a physical finding, however, the condition is subject only to personal interpretation of the changes in the ear drums, which were always inspected in these infections. As a complication, the figures for otitis media are exact except for the possible occasional case with delayed development seen directly by an otologist.

Inspection of this table immediately shows that epidemics of influenzal origin have no constant features. Epidemic No. 1 was not included in the table, since it occurred in part during the close of 1930. The spring epidemic of 1932, No. 2, was obviously a very mild type of disease, since complications were minimal in the absence of pneumonia and acute cervical adenitis. Coryza, vomiting and listlessness were relatively increased while pharyngeal and adjacent lymphatic involvement were decreased. The next influenza epidemic in the winter of the same year, No. 3, went to the other extreme. Coryza was increased, together with cough and aching, and these symptoms were associated with greater involvement of the pharynx and lower pulmonary tract. Otitis alone was practically doubled in incidence, which accounts for the notably increased rate of complications. The winter epidemic of 1934-35, No. 4, was intermediate to Nos. 2 and 3. The incidence of cough, earache and changes in the ear drums were elevated, but the noteworthy feature was the relative excess of lower pulmonary disease with average involvement of the nasopharynx and minimized adenitis. In spite of the increased symptoms and signs of otitis media, actual middle ear complications were decreased, contributing to the lowered rate of complications noted in this epidemic.

Passing to non-influenzal epidemics, a type of illness more severe than any influenza epidemic occurred in the winter of 1935. Although this period was not covered by the study of influenza reported by the U. S. Public Health Service, subsequent summaries of disease prevalence in the Public Health Reports[2] have not recorded any unusual incidence of influenza at this time. The strikingly high rate of complications in this

2. Summaries of Current Prevalence of Communicable Diseases. Public Health Reports, 50: 1779-1781, Dec. 20, 1935; 51: 53-56, Jan. 17, 1936.

epidemic involved uniformly the ears, glands and chest. Curiously enough, coryza and pharyngitis were decreased, but the excessive aching, listlessness and gastrointestinal disturbances were apparently premonitory signals for the relatively prolonged illnesses and high complication rate marking this epidemic.

Finally, the combined warm weather epidemics for all years have been tabulated together because of their consistent variations from the winter type of disease. In these seasons epidemics were noted in four of the five years reviewed here. The collective group showed a predominance of gastrointestinal symptoms and aching in association with an increased rate of adenitis. Complications were not common and the average duration of illness was notably shortened, approximately half of the attacks lasting three days or less. The clinical features of this group are very suggestive of the possible epidemic presence of unrecognized, non-paralytic poliomyelitis. Such an interpretation is based on the current theory that poliomyelitis is a general disease, clinically characterized by epidemics involving early age groups. This theory presumes that poliomyelitis is ordinarily prevalent as a mild systemic infection with actual paralysis an untoward and uncommon complication. There are many clinical observations and much sound laboratory evidence to support this view and the present group indirectly favors the occurrence of such epidemics. For comparison of the clinical features of the present group with poliomyelitis, the symptomatology of the latter, as given by Draper[3], might be quoted. He states that "the febrile reaction may be associated either with a coryza or cough, or with violent gastrointestinal disturbance usually a diarrhea and very often vomiting, or simply with general malaise and loss of appetite. At times no changes appear (in the reflexes). The fever is of short duration. The superficial lymph nodes are invariably palpable and almost always enlarged." This description is certainly in close accord with the features characterizing the epidemics noted here. As a matter of fact, in the present group, two cases of poliomyelitis were seen in the midst of the 1934 summer epidemic. One of these children had a transient weakness of the neck which might easily have been overlooked except for the concurrent illness in her twin sister which resulted in severe paralysis of the legs.

Discussion. From the epidemic data recorded in the present table it would appear that clinical studies merely exaggerate the recognized complexities of acute respiratory diseases. On the present chronological graph it is surprising to find that little or no opportunity is given to implicate the common cold as a demonstrable offender in initiating epidemic disease in children. Two contradictory explanations of this observation might be suggested, first, that colds are not severe enough to merit medical attention, nor to act as the cause of serious epidemic disease in early life, or second, that diseases classed as colds in adults occur simultaneously in this age group in a severe form inseparable from other infections such as influenza for example. Influenza virus infection, on the other hand, appears as a distinctive factor in the epidemic illnesses of this group. From the clinical viewpoint however there are no constant features in influenzal epidemics to identify them with each other or to separate them from non-influenzal disease. This suggests that the respiratory epidemics of winter, in children at least, are manifest clinically not in terms of a primary precipitating agent such as cold or influenza virus, but rather as exhibitions of other infectious agents, presumptively the secondary bacterial invaders ordinarily involved in these diseases. The immediate character of any epidemic, then, presumably depends upon the particular type of secondary invader prevalent and pathogenically active at the time.

From this viewpoint, it appears that diseases loosely termed acute respiratory at present must eventually be separated and recognized as syndromes of specific bacterial activity. Whether definite clinical trends can be associated with specific bacteria by the character of the epidemic and its complications, independent of bacteriological culture, is an undetermined and doubtful problem at present. The present epidemics are quite suggestive of the occurrence of variable secondary invaders with specific pathogenic trends.

The relative role and behavior of precipitating agents of epidemics, such as influenza virus, as regards their action on the host or secondary bacterial invader, or both, remain unsettled problems whose solution may eventually aid in con-

3. Draper in Cecil's Text-book of Medicine, 3rd Edition, 1933. W. B. Saunders & Company, Phil.

trolling these widespread illnesses. The possibility that epidemic poliomyelities is commonly prevalent in population groups of appreciable size, with rare instances of paralytic complications, must be settled by future studies. The frequency and severity of respiratory infections in infants and children can apparently be explained only by inherent differences of the host, since exposure to environmental infection must be approximately the same at all ages. The multiplicity of factors and problems involved in acute respiratory diseases at present are a challenge to continued investigation in a very important, but relatively uncharted field of medicine.

Summary. A clinical study of epidemic respiratory diseases in a group of infants and children over a five year period is presented. Four of the epidemics were apparently initiated by generalized influenza. From the character of the disease prevalent in epidemics, however, the presence of influenza could not be determined. Other epidemics could not be associated with precipitating factors, although the clinical features of summer epidemics were very suggestive of poliomyelitis. The clinical variations in epidemics, especially noteworthy in the influenzal group, suggest that acute respiratory diseases will eventually be recognized in terms of the specifically involved secondary invader. Clinically there are suggestions of characteristic syndromes in different epidemics, possibly related to the variable bacterial invaders of acute respiratory diseases. In addition to epidemic variation, however, marked individual variability is encountered in identical epidemics. These variations in reaction of the host are probably responsible for the increased frequency and severity of respiratory infections of early life.

DISCUSSION

Dr. J. Howard Beard, Urbana: I wish to congratulate Dr. Wilkinson on his excellent paper. Unfortunately, I have not had an opportunity to see the paper, the tables or charts, so I am just a little afraid that what I may have to say will be somewhat trite and largely irrelevant.

The respiratory diseases are characterized by their causative agents, entering the body through the nose or throat, and leaving it in the nasal and oral secretions. They include diseases as different as diphtheria, controllable by antitoxin and toxoid, tuberculosis with its economic and social problems, pneumonia with its multiple causes, omnipresent measles, the ubiquitous cold, and influenza which attacks modern man with the same frequency and virulence as it did centuries ago.

My few observations will be restricted to colds, influenza and their sequelae. These infections are a supreme challenge to the medical profession and the most important communicable diseases in the United States. They produce an enormous absenteeism in the public schools and are the major cause of loss of time from work in industry. Their prevalence is little affected by preventive measures, their death rates show no marked decline, and attempts at their control rarely do more than temporarily delay their spread. Medicine today is about as impotent in controlling pandemics of colds and influenza as it was when Hippocrates taught at Cos in the Periclean Age.

The complications and sequelae of acute respiratory diseases are more important than the original infection. Otitis media, sinusitis, tonsillitis and bronchitis cause colds and influenza to be painful, incapacitating and dangerous. Secondary invaders make them stepping stones to pneumonia, endocarditis, myocardial degeneration and renal damage.

The methods proposed for the prevention of acute respiratory infections have been numerous but usually have quickly become obsolete. Bathing, sleeping porches, ultra-violet light, chlorine inhalations, and special dietaries have not proved to be specifics. Experimental evidence suggests vaccines do not prevent infection with a filterable virus, but may increase resistance to secondary invaders which produce the complications of colds and influenza. "Keep away from the cougher and sneezer" is good advice, but is impractical in industry, in school, in the movies, or in the bus which takes us to the office.

Avoidance of exhaustion, the sterilization of eating and drinking utensils, and the correct use of the handkerchief are helpful in combating acute respiratory infection. If individuals can be educated to regard colds and influenza as potentially dangerous and to go to bed, keep warm and call the doctor when fever or marked symptoms develop, they will reduce the occurrence of complications, decrease the mortality rate of pneumonia and protect the public by semi-isolation.

Dr. Scott Wilkinson, Decatur (in closing): I do not think there is a great deal more to add. I had the same thing in mind that Dr. Beard referred to. After all, measles is nothing more than an acute respiratory disease with a characteristic rash. Scarlet fever is a similar infection, clinically recognized at times, however, without the rash. The ideal situation would be to be able to separate more of these groups so that we could think of them individually rather than in the mass.

"You are senile, old man," the young golfer said,
"And you swing like an awkward old cow,
Yet your score is consistently over my head;
Won't you tell me the why and the how?"

"In the days long ago," the old man answered back,
"How I practiced through sunshine and storm,
But now I step up and just hit her a whack,
And I don't give a damn about form."

—*C. G. Farnum, M. D., Peoria Medical News.*

VASOSPASTIC DISEASE OF THE HANDS OF MINERS DUE TO VIBRATION

C. H. Drenckhahn, M. D.
URBANA, ILLINOIS

It is most opportune at this time to call to the attention of the medical profession a syndrome occurring in the hands of coal miners. This syndrome consists of a numbness and blanching of the hands and is significant because of the fact that coal mining is such an important industry in the United States and especially in Illinois. It has been observed by people connected in some manner or another with coal mines that occasionally a miner will complain bitterly of having numbness and neuralgic pains in the hands especially in the winter time. This was thought to have been due in some way to his occupation, but no further explanation or inquiry was made. It has been known for some time that when the hands are exposed to tools of high vibratory frequency a disturbance in function occurs in the arteries of such traumatized members. This disturbance of function is one of vasospasm.

Thus far two tools have been incriminated in the production of this disease. They are the pneumatic hammer used by stone cutters and the instrument used by shoemakers in the manufacture of shoes. The coal miner's pick may be added to this list of tools which are responsible for vasospastic disturbances of the hands due to vibration.

Vasospasm in the hands due to the use of the pneumatic hammer was first described in 1917 by United States Public Health workers who were requested by the stone cutters' association to investigate the disease.[1-6] It was brought out in this investigation that the handle used in the air hammer weighed from two to 5 pounds and measured from six to twelve inches in length. This handle held a light cutting hammer which delivered about 3,000 strokes per minute. It was shown that the vibrations were directly transmitted to the handle of this hammer. Stone cutters exposed to such a light air hammer over a period of months or years suffered from a syndrome consisting of numbness and blanching of the hands which was interpreted at the time as being due to vasospastic disturbance. It was pointed out that structural steel workers handling an air riveting hammer seldom suffered from the disease because the hammer handle was heavier, the riveter was longer, and the tool delivered only about 1,500 strokes per minute. Certain remedies were proposed for the stone cutters' disease. Among them were the discontinuance of the use of the pneumatic hammer, the wearing of gloves and the reduction of the power of the grip and the body weight applied to the tool. In 1927[7] this syndrome was described in shoemakers who handled high frequency vibratory tools in the course of the manufacture of shoes. Here again the tool was light and the vibrations were quite high. In 1933 Hardgrove and Barker[8] reviewed the literature and reported a case of a patient with pneumatic hammer workers' disease. No reference has been found in the literature in which this disease has been described as being due to the use of the miner's pick. Likewise no one has ever demonstrated the vasospasm of this disturbance by means of arteriography.

The classical description of vasospastic disease of the hands due to prolonged high frequency vibration is almost stereotyped. After a few months to several years of exposure to the vibrations the patient notices attacks of blanching and numbness of the hands. These attacks do not occur while the patient is working but come on typically during his rest periods or during the night. The attacks usually come on more frequently in the winter months when exposure to cold is more prone to occur. Associated with the blanching and numbness most cases complain of a discomfort in the hands. In a few instances this discomfort is described as a toothache-like pain which is annoying enough to keep the patient awake at night and at times even to give him thoughts of suicide. The cause of the pain in vasospastic disease is not clear, but it is probably due to an anoxemia of the nerve endings. The attack can be relieved by rubbing the hands or by using any other method which will restore circulation in the parts. The fingers and parts of the hand involved are those that come in direct contact with the vibratory surface of the implement handled. Between the attacks there is no discomfort nor are any changes seen. There seem to be no secondary changes in the hand. In most instances permanent relief can be obtained by discontinuing the occupation although a few

From the Department of Medicine of the Carle Hospital Clinic.

Read before Section on Medicine of the Illinois State Medical Society, Springfield, May 19, 1936.

cases have been reported in pneumatic hammer workers where the attacks have returned on exposure to cold even after the work had been discontinued for a period of ten years.

This syndrome was discussed with a physician[9] who lives in the immediate vicinity of a coal mining district, and he has seen several cases answering to the description as outlined above. Several of these cases have come to my attention, and in this paper one of them will be described in detail.

The patient is a white male, aged 31 years, who registered at the Carle Hospital Clinic on February 8, 1936, with the chief complaint of numbness and pains in the hands and fingers. He stated that he had worked as a coal miner, handling a pick, since the age of fifteen years. At the age of 23 he had his first attack of numbness and pain in the hands. He thought this was due to his work and accordingly he quit mining and worked for one and one-half years as a plasterer's helper carrying mortar. The numbness left him in a short time while he was working at that trade. He returned to mining again at the age of 25 and has continued at that occupation up to the present time. At the age of 28 he noticed a return of his former symptoms.

The syndrome, as it was elicited from him, can be set down as follows: In the fall of the year when the weather became cold he noticed numbness and pain in the hand. This came on during his inactive hours and particularly at night. While at work he had no symptoms. The numbness and pain could be relieved by rubbing the hands or by flexing and extending the fingers. If the arms and hands were allowed to rest quietly in from ten to fifteen minutes the pain would return. He could not observe any blanching of the fingers due to the fact that his hands were always covered or stained with coal dust. The palmar surface and sides of the fingers of the left hand were involved while only the palmar surface of the distal half of the fingers of the right hand were involved. For the month prior to his admission the patient had slept very little. The weather had been unusually cold. To obtain any sleep at all he would "cat nap" by sitting on a chair in the reverse manner with his hands and arms hanging down over the back of the chair. The chair was near the stove. In this position he would be able to sleep for possibly three quarters of an hour at a time. He would then wake up with pain. He obtained relief in a few minutes by walking about the room, rubbing his hands or swinging his arms. He lost fifteen pounds of weight during that month. In the past he had observed that when warm, spring weather came on the symptoms would disappear only to return in the fall of the year. The temperature of the mine was constant at about 65 degrees. In handling the pick the patient stated that a severe stinging sensation was felt in over 50 per cent. of the strokes, especially if these strokes were a trifle off center. He also noticed that if he "picked" 25 tons of coal a day he had more numbness and pain at night. If he "picked" 12 tons a day he had much less pain. He averaged about 18 to 20 tons a day. He struck his blow both right and left handed. The left was always closer to the blade and took up most of the stinging sensation. Also, as was stated before, the left hand was the more involved of the two.

The family history was negative. His parents and grandparents were born in America. Originally he was of French, Irish and Scotch extraction. He smoked one package of cigarettes a day.

Physical examination showed the patient to be very nervous. The face appeared drawn. The temperature was 98.2° F. The mouth was edentulous. The heart, lungs and abdomen were negative. The blood pressure was 122/80. The cold test as described by Hines[10] was negative. The skin of the hands was cold and sweaty. Allen's test was negative for radial occlusion. However, upon occlusion of the radial artery by external pressure normal color was slow to return in either hand with the ulnar artery alone supplying the blood. An attack of pain and numbness could be precipitated by immobilizing the hands. During the attack, blanching of the fingers of the left hand could be seen, but this was not true of the fingers of the right hand. Neurological and fundus examination were both negative. The urine analysis, blood count, Kahn and Wassermann tests and gastric analysis were all negative or normal. X-ray examination of the cervical and upper dorsal spine was negative. The patient was permitted to have an attack of numbness of the hand, and then arteriography was carried out by injecting Thorotrast into the left brachial artery just above its bifurcation, according to the manner outlined by Allen and Camp.[11] These films were interpreted by Dr. Cesare Gianturco. He stated that the left ulnar artery showed a spastic area measuring about 1½ cm. in length and situated at the level of the wrist. There was no evidence of anatomical changes in the arteries.

Figure 1. Arteriogram demonstrating the spastic area of the ulnar artery.

In order that there may be a clearer conception of the methods involved in the treatment of such a case as this, we must review the mechanics of the pick. The pick is probably one of the oldest tools used by man. Since the stone age it has undergone considerable metamorphosis, so

that at the present time the modern patented pick is more complex although it still retains the fundamental mechanical principle of the ancient pick.

The patented pick was invented about 1900. The reason for its invention was one of convenience and necessity. About twenty pick blades are dulled in one day, and coal miners found it

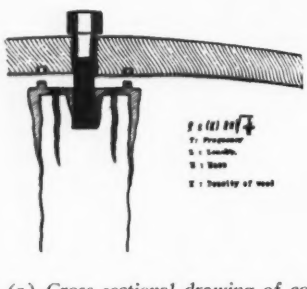

Figure 2. (a) Cross sectional drawing of coal miner's pick. (b) Formula for determining the frequency of vibrations.

rather inconvenient to stop to sharpen the dull blade that many times a day. It would have been too bulky to carry twenty picks to the mine in order to save that sharpening time. With the patented pick the blade can be detached from the handle. The twenty blades necessary for the day can be strung on a wire and transported to the mine very readily. At night they can be transported to the surface of the mine and there they can all be sharpened at one time. The end of the pick handle is fitted with a modified ferrule which contains a threaded inset. Two steel pins are driven into the handle through holes in the ferrule. These pins are inserted in order to cause expansion of the wood and to hold the ferrule tight to the handle. Two small knobs are located on the blade surface of the ferrule and fit into corresponding holes in the blade. These knobs are for the purpose of maintaining proper alignment of the blade. The blade is held fast to the ferrule by means of a heavy bolt which is screwed into the threaded inset. The handle of the pick is purchased in standard lengths of 22″, 26″ and 31″. Many miners saw off the pick handles to an 18″ length. After using the patented pick for a few minutes to half half an hour the blade becomes slightly loosened, especially if the bolt was not tightened solidly in the first place. The contact between the blade and the handle is metal. The shortened handle, the loosened connection and the metal contact all enhance the possibility of vibration.

The formula for the number of vibrations in this pick handle is $T = (K)\ 2\pi\sqrt{\frac{L}{M}}$, where T = Frequency, L = Length of the Handle, M = Weight of the Mass of the Pick Handle, and K = Density of the Wood. It has been estimated that the number of vibrations occurring in the pick handle used by the patient was about 4,000 per minute.

The treatment consists in eliminating the vibration as much as possible. This is carried out in several ways. First, a leather washer ¼″ thick is inserted between the bolt head and the pick blade. This leather washer is covered by a steel washer to prevent the bolt head from abrading the leather as the bolt is screwed into the threaded inset. In a similar fashion a thin leather washer is inserted between the pick blade and the ferrule. Second, the pick handle is covered with two layers of bicycle tape; and third, the laborer is to wear leather gloves. In a few days the patient is functionally well and remains so as long as he takes the above precautions.

In conclusion, a description has been given of a vasospastic disturbance in the hands of coal miners, this disturbance being due to the hands coming in contact over a prolonged period of time with the high frequency vibrations of the coal miner's pick handle. An arteriogram actually demonstrating the spastic disturbance has been presented. The mechanical imperfection of the patented pick has been described. The remedy for this imperfection has been outlined.

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DISCUSSION

Dr. Harold Voris: Dr. Drenckhahn's presentation has been of a great deal of interest to me, from two standpoints: First, the physiological one. Lewis, in the British Medical Journal in 1932, cited cases of "stone-cutters' disease" and "shoemakers' disease," which are comparable to this case of Dr. Drenckhahns, in support of his concept that the pathology in Raynauds disease was a local arterial disease of the extremities and was not an abnormal central vasometer reflex.

Without going into the question of Raynaud's disease, I think it should be pointed out that cases like this are not comparable to Raynaud's disease, first, because of a lack of symmetry, these processes being most manifest in that part of the extremity which is most subject to the vibrations; secondly, the lack of progression. Neither Dr. Drenckhahn's case nor the cases reported of stone-cutters' disease ever showed any progression, trophic changes or ulceration.

Rothstein's study in 1918 of cases of stone-cutters' disease demonstrated sensory changes in the extremity of greater extent than the areas in which the vasospasm appeared, and in areas which corresponded, at least grossly, to the peripheral nerve distribution.

For those reasons I would prefer to consider the pathology of this case as a locally induced vasomotor spasm in the peripheral vessels of the extremity, whereas I do believe in Raynaud's disease that one of the underlying factors is an abnormal vasomotor reflex. I think it could be suggested that those who have the opportunity to study further cases of this type might well attempt to settle this problem.

It occurs to me a diagnostic novocaine infiltration of either the cervicodorsal ganglia or an injection of the ulnar and median nerves, to see whether the spasm could be induced, after such a procedure, might help in settling the question.

The second point is a matter of therapy. This case of local induced vasospasm by vibration would seem to respond satisfactorily to conservative management directed at the removal of excessive vibrations, so that, while in the more severe cases of Raynaud's disease there is a distinct field for surgical intervention, in these cases there does not seem to be any need for surgical intervention.

IRRADIATION THERAPY OF INTRACRANIAL NEOPLASMS

T. J. WACHOWSKI, M. D., AND ADOLPH HARTUNG, M. D.

CHICAGO

Since 1906 both roentgen rays and radium have been used in the treatment of tumors of the central nervous system by many workers with various techniques and results. In that year, Raymond[1] in France showed the efficacy of the roentgen rays in syringomyelia and, in the same year, Babinski[2] obtained a cure in a case of compression of the spinal cord. In 1909, Beclere[3] in France and Gramegna[4] reported successful results with hypophyseal tumors. Other intracranial neoplasms were soon added to the list.

The early reports of irradiation treatment of intracranial growths showed a high mortality rate (16.9%) traceable directly to the irradiation. Less severe sequelae such as headaches, nausea, vomiting and increase of paralysis and of choking of the optic discs were common. Beclere[5] ascribed these untoward results to what he called the preaction. He believed it to be due to an acute hyperemia and swelling of the irradiated area, appearing in from one to several hours after the irradiation and disappearing in from 24 to 48 hours. This phenomenon, occurring in a patient already in a critical condition because of either generalized increased intracranial pressure or localized pressure of a tumor on a vital center in its vicinity, may easily cause death. Froment, Delore and Tassitch[6] measured the cerebro-spinal fluid pressures both before and after treatment in five cases and found increased values after the treatment. They obtained greater increases with larger doses, especially when the pressure was already high.

It is impossible to judge the efficacy of the therapy given by the early workers because of the variation of techniques and the impossibility of correlating the dosages. It was soon recognized that in certain cases irradiation was of no value. Ewing[7] in 1921, predicted that those tumors exhibiting marked anaplastic tendencies would be found more radiosensitive. In 1925, Bailey[8] reported the results of roentgen therapy

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in 59 cases which had received at least six treatments, On the basis of this experience and theoretical considerations, he concluded that the meningiomas, acoustic neurinomas, and suprasellar cysts were not suited for irradiation. The gliomas, he found, reacted irregularly Some of the cases of pituitary adenoma showed good results and a pre-operative trial of irradiation was recommended if the case could be closely followed by a neuro-surgeon. Post-operative deep therapy was thought advisable for all of this group.

In 1928, Bailey, Sosman and VanDessel[9] reported the results in 62 cases of glioma treated with roentgen rays from which histological material was available. Although it was often very difficult to accurately evaluate the relative improvement caused by the operation, and associated decompression, and that due to the irradiation, these workers reached certain conclusions. They found that irradiation caused marked temporary regression of medulloblastomas, but that recurrence was the rule. Roentgen ray therapy offered some relief and increased the duration of life in the spongioblastoma multiformes. In cases of astrocytoma protoplasmaticum, they noted only a slight average increase in longevity but a marked temporary amelioration of symptoms was often seen. Astrocytoma fibrillare, a slow growing tumor, was found ray-resistant. Astroblastomas, containing fairly numerous mitotic figures, were prone to early postoperative recurrence. Irradiation therefore seemed indicated, although the authors were unable to find any conclusive evidence of its value. The foregoing statement applied also to the oligodendrogliomas. In both of these groups, post-irradiation reactions were frequent. Neither the spongioblastoma unipolares nor the ependymomas were favorably influenced by roentgen therapy. Their findings substantiated Ewing's earlier prophecy.

These authors also stressed the need of operative exploration prior to irradiation firstly to verify the presence of a neoplasm; secondly, to check its clinical localization and extent; thirdly, to determine the nature of the tumorous growth so that radical surgical procedures could be performed where these offered the best prognosis; and, fourthly, to secure the benefits of decompression when irradiation is indicated.

The importance of verifying the presence of a growth is well illustrated by a case of subdural hematoma which we recently saw. The history and findings were indefinite, while the ventriculogram revealed marked displacement of the lateral ventricles. This finding ordinarily would be indicative of a fairly large growth in the temporoparietal area. The surgery done resulted in a cure while irradiation certainly would have been of no avail. As regards the correct localization of the lesion, occasionally the symptoms and findings may be misleading. Thus one case in this series was explored suboccipitally with the confident expectation of finding a posterior fossa tumor. None was found there and a subsequent ventriculogram showed a wide separation of the frontal horns of the lateral ventricles, indicative of a corpus callosum tumor. Likewise, the clinical signs, and even the operative findings, may not disclose the true size of a tumor. Two of our glioblastoma cases received inadequate therapy to parts of their tumors because of ignorance of their very large extent as revealed by subsequent autopsy findings. Finally, the high mortality of the early workers is ample proof of the dangers inherent in the pre-reaction occurring within a closed skull. If a decompression has been done, the opening in the bone acts as a safety valve and the danger of serious post-irradiation sequelae is greatly reduced. Where operative procedures disclose a lesion which is known to be radioresistant, irradiation is ordinarily contraindicated. Then again, in certain more or less radiosensitive groups, such as the gliomas, operation may demonstrate cystic or very slow growing lesions which may not be amenable to complete removal but can be markedly benefited by subtotal resection followed by irradiation.

In connection with the pituitary tumors, these may develop from any of the different cell types contained within the hypophysis. The predominance of one or the other type of cells in these adenomata gives rise to different clinical manifestations and has a direct bearing on the response to irradiation. It is generally accepted that the chromophile cells, which are predominant in the adenomata responsible for gigantism and acromegaly, are susceptible to irradiation and therefore such treatment is indicated in these conditions. Only rarely are good results seen in those tumors with a predominance of chromophobe

cells. Rand and Taylor[10] believe that the occasional good results seen are due to the fact that tumors of the pituitary gland do not necessarily run true to any one cell type but may, to some degree, be mixed. The predominating cells may be of the chromophobe type, but there may also be present a smattering of other types of cells. In adenomata with a predominance of basophile cells, irradiation is the only feasible treatment because of their small size. Striking recession of the hypertension found in these cases is sometimes seen.

Although the opinions in the literature as to the advisability of roentgen treatment of pituitary tumors are divided, many radiologists and some neuro-surgeons recommend irradiation for pituitary adenomata of any cell type as a primary measure. Treatment should be administered only if there is no great constriction of the visual fields and with the close co-operation of an ophthalmologist and a neuro-surgeon. If no improvement occurs in six months with adequate therapy or if the visual acuity and field recede, a diagnosis of a cystic tumor or ray-resistant adenoma seems probable and operation advisable.

Irradiation therapy is indicated whenever it is impracticable to remove surgically any or all of a tumor of the brain substance. Even though the cell type offers little hope of permanent benefit, it should be instituted because of the lack of any other therapeutic measure. Pancoast[11] calls attention to the fact that brain tumors rarely metastasize and therefore can be removed in part with safety, the remaining portion being left for irradiation. As regards the technique much depends on whether or not a decompression has been done. If none has been done, one should proceed with care, gradually increasing the individual dose until the tolerance of the patient is determined. Any untoward reaction demands immediate cessation of therapy until it has subsided. If a decompression has been done, one may proceed more radically, since it obviates the danger of increasing the intracranial pressure unduly. Even in these cases, however, reactions may occur when the tumor is very close to a vital center.

In view of the above, it is readily seen that the massive or so-called German treatment technique is not to be advocated, especially if no decompression has been done. It was attempted by various workers who were forced to suspend therapy because of the severe reactions. Roussy, Bollack, LaBorde and Levy[12, 13] gave up to 20,000 R (Solomon) in 20 successive days using five portals and as much as 2500 R in two treatments, using two portals. Later in their series, the daily dose was cut to 500 R per sitting. Bremer, Coppez and Sluys[14] tried similar doses. Beclere[5] soon began to fractionate his dosages. Pfahler[15] applied Kingery's[16] saturation theory to deep seated lesions and was able to give up to 500% of a skin erythema dose in five weeks to brain tumors without producing marked reaction. The skin showed only erythema with epilation. Pancoast[11] in 1928 reviewed his experiences with brain tumors. He used radium both by means of implants and external cross-firing and later utilized roentgen rays. He warned against the dangers of implanting radium directly into brain tissue. His impression was that external radium was superior to the roentgen rays. He also stressed the importance of fractionating the dosage in order to minimize the reactions.

During the past twenty months, we have irradiated fifteen cases of brain tumor from the service of Dr. Eric Oldberg at the University of Illinois Research and Education Hospitals. We used 200 peak kilovolts, ¾ millimeter copper and 1 millimeter aluminum filter at 50 centimeters. Ten milliamperes was used delivering 20.7 r per minute. The doses varied from 125 to 400 r per sitting. The usual dose was 300 r at one daily sitting. The total doses, in cases which received the entire course, ranged from 7,200 r in one of the first cases to 17,200 r in one of the later ones. About 15,000 r was the usual total dose. From 3 to 5 portals were used. All but one of the cases had preliminary operative exploration and decompression and in some an attempt was made to remove the tumor. One of the cases had received a short course of irradiation elsewhere and one had been treated by us previously with a different technique. Of the 15 cases, 8 were considered favorable for irradiation because of the histological type or rate of growth of the tumor. In 6 the treatment was undertaken because surgery was impracticable and irradiation offered the only possible therapeutic aid. In one of the cases no tumor was found but the clinical evidence pointed strongly to its presence.

The ray-sensitive group included 5 glioblastomas and 3 medulloblastomas. Of the 5 glioblastomas treated, one died during therapy after 11,000 r had been given. A second case recurred within a month after 7,950 r had been delivered. A third case was given 15,000 r and recovered sufficiently to return to work for a month. Then rapid recurrence set in. A fourth case after only

an exploratory operation received 15,000 r and is in good condition a year later. A fifth case has just recently concluded a series of 15,000 r and has shown definite improvement. Of the three medulloblastomas treated, one died during treatment after 6,250 r had been given. A tremendous hydrocephalus was found at post-mortem. A second case had received x-ray twice previously and was Coutarded for her second recurrence of symptoms. She failed to improve with 6,000 r units. A third case had an exploratory operation and a short course of x-ray in June, 1935. He was Coutarded locally to the medulla and then 900 r was given as prophylaxis to the rest of the brain and to all of the spinal cord. He is in good condition today, one year later.

Of those cases treated mainly because surgery was too hazardous, one, an infiltrating tumor of the pons, died after only 1,400 r, given with care because no decompression was present. A second case, a tumor of the corpora quadrigemina, died 3 weeks after receiving 15,000 r units. Two of the cases were tumors of the third ventricle both of which showed a marked temporary improvement followed by rapid decline. A fifth case was a tumor of the corpus callosum. He received 8,400 r and is in excellent condition now, 16 months later. A sixth case had an infiltrating glioma of the brain stem and has shown progressive improvement in the six months since irradiation with 15,000 r. The last case of the series had a long history of headaches. Marked choking of the discs was present and films showed evidence of increased pressure and dilated lateral and third ventricles. A suboccipital exploration was negative. She received 17,200 r directed to the posterior fossa. After a mild reaction in the early stages of the series, she rallied and is now in good condition, more than 6 months later. The possibility of her having a simple adhesive arachnoiditis cannot, of course, be ruled out on the evidence at hand.

In general, the treatments were very well tolerated. Only occasionally was headache noted. Two of the medulloblastomas had vomiting, one for only a day or two, the other persistently. As far as could be determined, none of the deaths which occurred during treatment could be attributed to the effects of irradiation. It was quite evident that, even though no favorable effect was produced in some of the cases, irradiation had no demonstrable deleterious effect on the course of the disease. The skin showed epilation following an erythema which was never pronounced. There was occasional dry scaling. Some of the cases have shown a remarkable regrowth of hair.

Although too few cases have been treated and too short an interval has elapsed to warrant the drawing of definite conclusions relative to the efficacy of the treatment of brain tumors by roentgen rays with this technique, the results are sufficiently encouraging to continue it. In the main, our results approximate those obtained by workers with other techniques. Even though no claims for cure can be made, some of the cases have shown striking improvement beyond what we would have expected from the technique ordinarily used. In view of the general hopelessness of cases where operation is inadequate for cure, and no other satisfactory methods of treatment are available, irradiation offers to some of them prolongation of life and relief of distressing symptoms.

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DISCUSSION

Dr. H. C. Voris, Chicago: I am very much interested in this from the standpoint of a neurologic surgeon. I would like to reiterate what I consider was well placed emphasis on the value of preliminary exploration and decompression, both from the standpoint of a safety valve to preserve vision and to prevent development of increased intracranial pressure during the period of treatment and of waiting for treatment to take effect. Also in all possible cases the value should be emphasized of having a biopsy of the tumor in order that more intelligent treatment may be carried out. I think those points were well emphasized in this paper.

Apropos of this discussion I was much interested in

a presentation I heard by Dr. Spurling of Louisville last week on irradiation therapy of the tumors of the third ventricle which are deep seated, many of them malignant, and carrying considerable operative risk. He recommends, and I think correctly, preliminary diagnostic air studies. Of course, as repeatedly pointed out, these tumors can hardly be diagnosed except by the use of preliminary air studies. He recommends decompression and sub-temporal administration of x-ray therapy. There are some benign tumors of the third ventricle and if improvement is not seen within four to six weeks after irradiation of the third ventricle, surgical measures directed at the removal of the tumor should be instituted. Certainly it is logical with proper preliminary surgical precautions to attempt irradiation therapy of these deep seated tumors before subjecting these patients to the risk of surgical exploration.

This type of work, I think, illustrates well the advantage of close cooperation between the roentgenologist and neurosurgeon, as Doctors Wachowski and Oldberg have been doing.

It is true there are certain neurological measures to be carried out in the period of treatment, not all surgical but some of them general. These measures are toward the prevention of development of increased intracranial pressure and include the administration of hypertonic solutions as glucose or, what seems to be more advantageous, sucrose, the limitation of fluid intake, saline catharsis, and finally the removal of fluid by ventricular, or in select cases, by spinal tap. If done carefully patients can often be tided over this post-treatment reaction by the use of some of those measures where they might be lost if not instituted.

I would like to cite a case out of my own experience which illustrates the great value of x-ray treatment in certain cases. Eighteen months ago a man with a short history and neurologic findings pointing to a neoplasm of the left cerebral hemisphere was explored. Exploration revealed a large vascular infiltrating tumor in the left cerebral hemisphere and biopsy revealed highly malignant oligodendroglioma. This patient had no postoperative complications until the fifth day when he gradually developed a right hemiplegia and an aphasia. We considered this due to vascular changes in and about the tumor rather than to postoperative bleeding and went ahead with irradiation therapy. Gradual improvement has taken place and at the present time he is absolutely free of symptoms or of objective neurologic findings except for slight bulging of the decompression and he is supporting himself and his mother by working as an automobile salesman.

Dr. Wachowski: I wish to thank Dr. Voris for his discussion and his remarks about the cooperation which should be present. It is very nice to tide over some of these patients. We have done it often. I did not mention that point in order not to prolong the paper unduly. Also I did not mention some of the accidents that might happen during therapy, because such things as vascular accidents in these tumors, some of which ave very vascular, are really not the fault of the irradiation therapy and have nothing to do really with the statistics regarding the benefit to be derived from the roentgen therapy. So I think if we do this work carefully, pushing the dose as far as we can, we will get some benefit from it.

After all most of the tumors we consider as sarcomata are very notably radio-resistant or are difficult to treat by roentgen rays when elsewhere in the body. We have to consider we are dealing with sarcomata of the brain and not be discouraged too early by poor results in the first stage of the game.

A METHOD OF PERFORMING NEPHROSTOMY AND ITS VALUES

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BEARDSTOWN, ILLINOIS

Nephrostomy has been used more or less for the past 45 years. At first it was performed as an emergency measure on very sick kidneys without very great knowledge of the remainder of the urinary tract. In 1898, Guyon and Albarran pointed out the great ability of renal tissue to resist infection and its great ability to recover from infection once satisfactory drainage had been established by nephrostomy.

Pakowski in 1913, according to Cabot, after considerable investigation, concurred with Albarran's opinion.

Aside from the experimental work of Hinman in 1922, and Joelson, Beck, and Moritz in 1929, little had been written regarding nephrostomy before 1932. In May, 1932, Doctor Hugh Cabot and I published a paper, reviewing the subject in which we pointed out the following indications for nephrostomy:

1. *Renal Calculi.* Where there is already destruction of the renal tissue because of obstruction, temporary nephrostomy may be of value to give efficient drainage until the pelvis and ureter start functioning, and to allow a more rapid return of kidney function and probably help rid the kidney of infection by efficient drainage.

There is another group of cases where massive stones are present on each side with few or no symptoms but where there is a progressive diminution of renal function. Of these cases not suitable for removal, nephrostomy offers a new lease on life.

Watson, in 1910, suggested nephrostomy for relief of some of these patients. He reports one such case in which he performed bilateral

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nephrostomy that maintained satisfactory real function for ten years.

2. *Acute Obstruction* of both ureters or of remaining one in calculus anuria or malignant disease obstructing the lower end of the uterus.

3. *Hydronephrosis* or infected hydronephrosis in which the cause of the obstruction may be removable, but in which drainage of the kidney is important to preserve or improve function.

4. *Nephrostomy* must perhaps be retained as an occasional method of diverting the urinary stream in carcinoma of the bladder where total cystectomy is contemplated.

In this group where the ureter is diseased and in certain conditions, cutaneous ureterostomy is probably the method of choice. Whether the nephrostomy is to be permanent or temporary will depend upon the conditions for which it is done. If the obstruction cannot be relieved, the nephrostomy which has been done as a temporary measure, will of necessity become a permanent one.

Technique. The earliest workers exposed the kidney and accurately placed the tube in the kidney pelvis through an incision along the convex border of the kidney. Marion later introduced a dilator through the cortex into the renal pelvis, through which he passed a catheter. (Fig. 1.)

Fig. 1. Marion's Method of Nephrostomy.

Later through a small incision in the kidney pelvis he passed a curved instrument out through the cortex and drew a drainage tube into the kidney pelvis. Papin in 1927 suggested the use of a winged catheter that would maintain its position in the pelvis of the kidney. (Fig. 2.)

Whenever one is contemplating a nephrostomy, because we usually have both a sick patient and a badly damaged kidney, there are three important requirements to consider as regards the choice of technique employed.

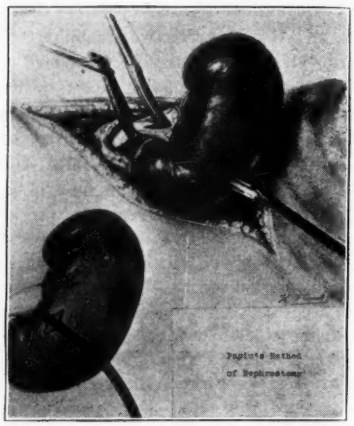

Fig. 2. Papin's Method of Nephrostomy.

First—That the operation be done in the shortest possible time.

Second—That a minimum amount of trauma be done to the tissues.

Third—Having done the operation, that we have established the best possible drainage of the kidney pelvis.

The method I am about to describe is particularly good regarding the first two requirements: that is, the element of time and the minimum amount of trauma. It also facilitates the fulfillment of the third requirement, that is, the drainage of the kidney through the lower calyx, which point Cabot and Jolly have indicated as being anatomically the correct point for the insertion of a nephrostomy tube.

While working with Doctor Cabot in 1930, I suggested the use of a uterine probe and a stout piece of silk to facilitate the introduction of the nephrostomy tube. Quite often in some cases mobilization of the kidney sufficient to pass a curved instrument from the pelvis out through the cortex was impossible or the amount of dissection required would unnecessarily complicate and prolong the operation. In some other cases where the pelvis is entirely intra-renal, the method suggested by Marion would be extremely difficult.

The method I wish to describe this afternoon is as follows:

After the kidney (Fig. 3) has been mobilized sufficiently to expose the renal pelvis and upper ureter, a small opening is made in either one of

these two structures, depending upon which is the most accessible. A uterine probe with a bulbous tip bent in form of a V, is introduced into the opening and brought out through the renal cortex at the point selected. As I have stated before, this point should be so situated that drainage will be established through the lower calyx. It should also be placed in relation

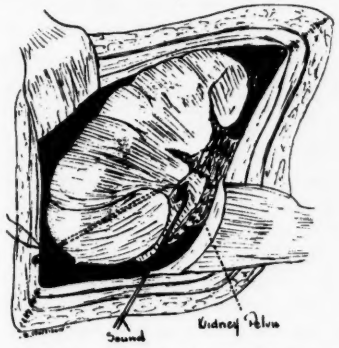

Fig. 3. Method of introducing uterine sound into pelvis, passing it out through renal cortex and attachment of silk guide.

to the convex border of the kidney in such a way that the drainage tube will lead straight from the wound and not be subjected to angulation when the kidney falls back into its normal position. This point can easily be ascertained by noting the kidney's natural position.

A piece of stout silk is then attached to the bulbous tip, withdrawn through the kidney and

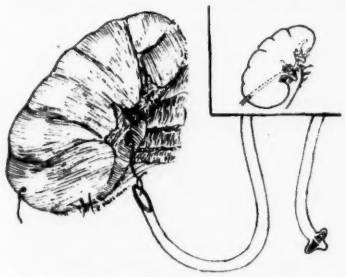

Fig. 4. Use of silk guide to draw winged catheter into proper position in renal pelvis.

out of the opening in the pelvis. The end of a No. 22 or 24 French Winged Catheter is then trimmed to a point and attached to this silk suture. (Fig. 4.) Traction on the suture then draws the catheter accurately along the tract created by the sound until the winged end lies in the pelvis at the desired position. The catheter fits the tract in the renal parenchyma so snugly that bleeding will be entirely controlled. The opening in the kidney pelvis is allowed to heal spontaneously which usually takes place within a week.

The winged catheter is not fastened to the kidney or any of the over-lying tissues. However,

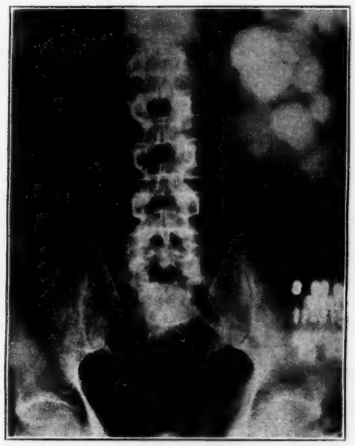

Fig. 5. Intravenous Pyelogram showing large left hydronephrotic kidney.

it is kept in mind when suturing the incision, that the catheter should emerge from the kidney to the skin entirely free from any angula-

Fig. 6. Pyelogram through a nephrostomy tube.

tion. The original catheter is left in position for two weeks at which time a straight tube is substituted. For this purpose a No. 22 rectal tube which has an opening in the end and in the side seems best. The winged catheter is removed by passing a stilette through it when

traction of the catheter will smooth out the wings and avoid laceration of the kidney tissue as it is removed. If the straight tube is immediately measured and introduced to the same depth, most satisfactory drainage can then be obtained. (Figures 5, 6 and 7.) The position of the tube

Fig. 7. Check to show position and depth of the straight tube.

should be checked by x-ray after the initial change. Later the tubes can be changed by members of the family.

The advantages of this technique are:

1. Complete mobilization of the kidney is unnecessary.

2. There is less injury to renal tissue than by previous methods.

3. The difference of calibre between the uterine probe and the catheter will serve to control bleeding from the renal parenchyma.

4. The tube can be quickly and accurately placed in the kidney pelvis.

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DISCUSSION

Dr. E. I. Greene, Chicago: There is not much I can add to Dr. Holland's paper except to bring out the fact that nephrostomy, as he has indicated, will probably save a lot of kidneys that otherwise we would remove. In some of these hydronephrotic kidneys or some of the severe pyelonephrotic kidneys, if we drain the kidney for a considerable period of time, we may be able to save the kidney. The value of this method, as I see it, is rather its simplicity and the fact that you do not dissect the entire kidney. We ordinarily think of doing nephrostomy on patients who are very sick. By not shelling out your entire kidney, you will save time. This reminds me of a seriously ill patient in whom a classical nephrostomy was done. The tube was inserted and the patient continued to bleed, eventually requiring a nephrectomy. By using a small probe and putting through a tube larger than the opening in the kidney, it acts as a tampon and will prevent hemorrhage. I think this is a splendid idea and that Dr. Holland should be complimented.

Dr. Herman L. Kretschmer, Chicago: I think Dr. Holland has covered the indications for nephrostomy very well and he differentiates between the institution of temporary drainage and permanent drainage.

The occasions for temporary nephrostomy do not arise very often. In my experience ureteral catheter drainage generally suffices.

The question of kidney drainage following the removal of stone is one that has again received a good deal of attention and I use it routinely following the removal of stones whether by nephrostomy or pyelotomy.

Formerly, accurate closure of the kidney pelvis so that there would be no leakage of urine and no attempts to drain the kidneys was the method of choice. The pendulum has swung away from this view in favor of drainage. I drain practically every case. The idea we follow is much the same as that prescribed by Dr. Holland except that I drain through the lower pole of the kidney and not through the middle of the kidney as he does, as illustrated by the lantern slides. This is a simple procedure and is carried out in the following manner: A curved hemostate is drawn through the opening in the kidney pelvis and passed into the inferior calyx and the forceps is passed through the kidney substance; the drainage tube is grasped with the forceps and pulled back into the kidney pelvis and the pelvis closed by means of catgut. The drainage tube is anchored into place. The catgut stitch is passed through the capsule of the kidney.

PRACTICAL POINTS IN HEARING TESTS AND SELECTION OF HEARING AIDS

ROBERT SONNENSCHEIN, M. D.
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It is only at the urgent request of your esteemed secretary that I am presenting a brief summary of practical points in the carrying out of hearing tests. This subject has been covered in detail by many others and myself during the past twenty-five and more years.

1. *Observation of the patient* is of considerable importance. In getting a rough estimate of the patient's ability to hear, one should note his general attitude; the close attention with which the lips of the speaker are watched; the placing of the hand behind the better hearing ear (the hand acting as a collector of sound waves and as a resonator); and the difference in the loudness of the voice.

With conduction apparatus impairment, bone conduction is increased, so the voice seems very loud to the speaker and, for fear of offending, he speaks very low. When bone conduction is diminished however, as it is in perception apparatus impairment, the individual's voice sounds very low to him and, in order to make himself easily understood, he is likely to speak very loud.

2. *Examination of the Patient:* It is necessary to carefully inspect the external ear, noting whether there are any swellings, inflammatory or otherwise, whether cerumen or foreign bodies are present in the external auditory canal; to observe the condition of the drum membrane as to whether it is normal or shows dulness, thickening, perforations; and if so, whether they are central or marginal; also note if there is secretion (serous, mucopurulent or purulent) in the middle ear, observing the color of the mucosa and whether granulations are present in the tympanic cavity.

3. *Inspection of the pharynx* is carried out, observing the size of tonsils, the secretion on the posterior wall, etc. Examination of the nasopharynx is made to see whether adenoids, tumors or adhesions are present, and whether there are any changes about the orifice of the Eustachian tube.

4. *Nose:* Inspection is done to determine whether deviation of the septum, hypertrophied turbinates, polyps or tumors are present. Obstruction to the passage of air through the nose does not have much bearing on hearing, but interference with drainage from the nasal accessory sinuses might cause pus to invade the nasopharynx with possible infection of the middle ear by way of the Eustachian tube, or interference with proper aeration of the tube by large posterior end of inferior turbinate, may cause impairment of hearing for low tones.

I have for a long time been of the positive opinion that so far as the essential testing of hearing is concerned a very simple armamentarium is all that is needed. The human voice, a few tuning forks, the careful performance of a few essential tests, their proper interpretation, plus the clinical history and careful examination of the patient, are all that are needed to make the diagnosis, to determine the prognosis, and institute whatever treatment may be available. If the clinic or the otologist has available one of the various types of audiometer, so much the better. For actual research work the audiometer, especially one with a wide range of pitch, is highly desirable.

Voice and Watch: Hearing is usually tested by means of tones, noises or a combination of the two. A tone is sound produced by a number of equal and regular vibrations, while noises are sounds due to irregular vibrations, irregular both in length and in time. The use of the Politzer acoumeter or the ordinary watch carries with it a number of fallacies. In the first place, the acoumeter is rather high pitched, so that if the individual is deaf for the low tones, this fact cannot be elicited by this instrument alone; and secondly, the acoumeter produces a noise, not a tone.

The watch is not an accurate instrument, since no two watches have the same pitch or intensity; and secondly, noises and not pure tones are produced. As a rough measure the watch may be used, especially when no tuning forks, etc., are available.

Bezold originally assumed the speech area to be very limited in extent, namely, from b^1 to g^2, but we know that the voice sounds range from about 200 to 4,000 or 5,000 d.v., the highest overtone of the vowel "E" being at the latter pitch. If an individual can hear all low tones below 200, and all high ones above 5,000 but cannot appreciate those lying within this range, he is unable to understand the spoken voice, and is thus deaf,

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for all practical purposes, so far as human intercourse is concerned.

When testing with speech, one should endeavor to use the same intensity each time by employing the residual air, with the patient standing at the farther end of the room, and no part of the body touching the wall or heavy furniture. The opposite ear is occluded with the moistened finger, and the eyes closed or averted from the speaker. The examiner should approach the patient from a distance, noting at which points both low and high pitched sounds are heard. In English, the numerals are low pitched, except sixes and sevens.

In an open unconfined space, the intensity of sound varies inversely as the square of the distance. In a room or other enclosure, this rule does not accurately apply, since there is a reflection of sound from the walls, furniture and other fixed objects. In other words, if an individual hears one-half the distance that is supposed to be normal, it does not mean that his hearing is reduced one-half, for it may be reduced to one-quarter or some other fraction. However, a good relative idea may be obtained of the state of the hearing by noting the distances at which the various sounds are heard.

Certain points should be mentioned with reference to the physics and the action of forks. Tuning forks consist of prongs and a stem. The best forks are made of one piece of metal, should vibrate for a considerable length of time, ought to be as free as possible from overtones, and preferably made of rustless metal. The prongs of tuning forks vibrate transversely with wide excursions, but little intensity. The stem of the fork at the same time is moving in a longitudinal direction, with tiny excursions but great intensity. When sounding bodies such as strings are excited, we get not only the fundamental or actual tone of the string, but also certain overtones or harmonics. Usually the first harmonic is the octave of the fundamental, with twice the number of vibrations per second; the next harmonic is the fifth above that, and the third overtone is the second octave above the fundamental. When tuning forks are struck, overtones are also heard, the first of which usually has a loud, shrill tone, with a vibration frequency over six times that of the fundamental; these overtones are very confusing, and in order to eliminate them it is advisable to place metal weights on the lowest pitched forks. This, however, adds greatly to the weight of the fork, and also lessens the period of vibration. On some of the medium pitched forks, instead of using weights, pieces of rubber tubing may be applied to the ends of the prongs to serve the purpose of eliminating overtones without adding to the weight of the fork, or to any appreciable degree shortening the period of vibration.

The Committee on Standardization of Tuning Forks and Hearing Tests of the American Academy of Ophthalmology and Oto-Laryngology, on which the writer had the honor of serving for twelve years in association with Drs. L. W. Dean, Geo. W. Mackenzie and E. G. Gill, sought and found a metal which would be rustless or rustproof and at the same time have elasticity like that of the steel used in tuning forks. Some years ago a series of forks made with an alloy consisting largely of magnesium and aluminum was perfected at the Riverbank Laboratory by Mr. E. B. Eisenhour, and this material has solved the problem. These forks are very light in weight, as compared with steel, which has a specific gravity about 7.8. That of aluminum is 2.7, while that of magnesium is about 1.7, so the alloy is about 2.8. The cost of manufacture is less than that of the steel forks, and the vibration period of these forks is practically the equal of the best steel forks.

Forks are usually made in a range from C-2 (16 d.v.) to c-5 (4,096 d.v.). Forks as low as 12 d.v. and as high as 14,000 or 16,000 d.v. have been produced, but are not feasible for ordinary work, are rather difficult to obtain, and expensive. Few individuals are able to hear below 16 d.v., especially in noisy cities. Whistles, sounding rods or the monochord may be employed for testing the highest tones.

The Committee of the American Academy of Ophthalmology and Otolaryngology believes that for doing the ordinary or usual tests it is not necessary to possess more than five or six forks, and for this purpose recommends the C-1 (32 d.v.) C (64 d.v.), c-1 (256 d.v.), c-2 (512 d.v.) and c-5 (4,096 d.v.). For the Weber and Schwabach tests many individuals prefer the large unweighted A (108 d.v.) fork, while for the Rinne test as well as the Stenger test the unweighted a-1 (435 d.v.) fork is preferred.

For exciting the forks it is best to decide upon one definite routine, so that the results obtained may be fairly uniform and comparable to those made in other cases. The general rule is that

the lower the pitch of the fork, the softer should be the material used for striking or exciting it. For the very lowest ones, the side of the hand (hypothenar eminence) may be used; for the medium pitched, a rubber tipped pleximeter, and for the highest forks a metal hammer. A pendulum of metal covered at the end with rubber gives accurate and uniform results, since it can be made to fall each time through the same arc, thus giving the same intensity of impact. At about the junction of the distal with the middle third of the prong is the so-called "percussion point." Striking the fork in this area gives the greatest duration of vibration with the least overtones. The larger unweighted lower pitched forks may also be excited by holding them at right angles to the thigh, and allowing them to fall through an arc of 90 degrees, striking the flat or outer surface of the prongs against the knee. The higher pitched forks may be excited in three ways, giving varying degrees of intensity; namely, by rubbing the prongs with the finger, striking the prong with the finger nail, or as previously mentioned, with a metal hammer.

When testing air conduction, the outer or broad surface of the prongs, which usually gives the greatest intensity of sound, should be held close to and parallel with the ear, carefully avoiding contact with the auricle or vibrissae. For bone conduction, the stem of the fork is usually placed upon the mid-line of the vertex, or over the mastoid region. The former method is used in the Weber and Schwabach tests, and the latter in the Rinne test. In the Sonnenschein-Minton modification of the Rinne test the stem of the fork is used for both air and bone conduction. With this procedure we get the same result as when the stem is used for bone and the prongs for air conduction, and thus the theoretical objections to the Rinne test are overcome.

The principal tests are the Weber, Schwabach and Rinne.

Both for the Weber and Schwabach test a medium pitched, rather heavy fork is used. One of the most popular is the Bezold unweighted (108 d.v.) fork. However, the weighted c-1, known as d sharp (dis) (154 d.v.), or the c-1 (256 d.v.) may be used. Of the magnesium alloy forks, c (128 d.v.) serves very well. These forks may be excited by allowing them to drop from a perpendicular position to a horizontal one, striking the knee or thigh, thus giving a uniform excitation to the fork.

The Weber test is used for determining whether lateralization is present by placing the fork in the median line of the vertex and the patient asked whether he hears the tone lounder in one ear than the other or whether it is heard louder "in the head." In normal individuals there is no lateralization of sound. In middle ear or conduction apparatus impairment, lateralization is usually to the worse ear; with inner ear lesions it is usually to the better ear. There are many exceptions to this rule and thus the Weber is the least reliable of the major tuning fork tests, and is of value only when it agrees with and confirms the other tests. If, however, with the Weber lateralized to the worse side in a middle ear infection, there is suddenly a change in lateralization to the better hearing ear, it usually means an extension of the infection to the inner ear (labyrinthitis) of the affected side, so that the Weber then gives most important information.

The Schwabach test is carried out in the same manner, and the duration of the individual's hearing by bone is determined. In order to avoid the "fatigue" symptom, after a certain length of time the fork is lifted from the head, then replaced and the patient asked if he again hears the tone. The procedure is repeated until the sound is no longer heard after the fork is returned to the vertex. The examiner then sets the fork upon his own head to see whether the patient's bone conduction is shorter or longer than his own, in order to learn whether the patient is normal or otherwise. I have always felt that it is better to have an objective control, obtained by testing a large number of individuals with certain forks to find the average duration of bone conduction at different ages, and then comparing this figure with that obtained from the patient. The Schwabach test determines the bone conduction in the individual compared with a normal living or an objective standard. A slight diminution or a slight increase in bone conduction is of no significance, but a markedly increased bone conduction usually means conduction apparatus involvement; and a decidedly shortened bone conduction usually indicates a perception apparatus impairment. Bone conduction, however, is affected by many factors, such as age, the thickness of the skull, adhesions of the dura to the bone, etc.

The duration of bone conduction has always

seemed to me most important, for upon it rests in a large measure the diagnosis of the hearing impairment, especially with reference to the question of whether it is the conduction apparatus or the perception apparatus that is involved, or whether it is a combination of the two.

The Rinne test compares the air with the bone conduction in the same individual. A medium pitched fork, c-1 (256 d.v.) or a-1 (435 d.v.) is employed. In normal cases we have the positive Rinne, that is, air conduction is much longer than bone. Whenever bone conduction is longer than air, we have the negative Rinne. After the tuning fork is no longer heard when applied to the region of the mastoid antrum, the sound will still be heard by air conduction in the normal positive Rinne. When air conduction is longer than bone, but both factors are shorter than normal, we have a positive Rinne, but one that shows an inner ear lesion. There are also several varieties of the negative Rinne, depending upon the duration of the bone conduction. A negative Rinne usually means an impairment of the conduction apparatus, but when both air and bone conduction are much shorter than the normal, even though bone conduction is still longer than air, it usually means a combination of inner and middle ear disease. With an "infinitively negative" Rinne there is no hearing by air but slight hearing by bone, and this usually means that the ear under examination is practically deaf, and that the hearing by bone is due to "diagonal resonance," or crossed perception, and is really heard in the opposite or normal ear.

The determination of the upper and lower tone limits of the individual is very important. In order to find the lower tone limit, we begin with the lowest forks at our command, C-2 (16 d.v.) or C-1 (32 d.v.). The fork is struck, the eyes of the patient are closed, and approaching his ear, he is instructed to say when he first hears the sound. Of course, he must differentiate between merely feeling the vibration of the air striking the auricle and actually hearing the tone of the fork. We advance in the scale until we reach the point at which the patient begins to hear, and that is the lower limit for that ear. We then continue up the octaves until we reach c-4 and c-5.

When testing with the high tones, it is important that the opposite ear is closed, and that the fork c-4 (2,048 d.v.) or c-5 (4,096 d.v.) is held close to the ear that is being examined. When the patient no longer hears the sound, remove the fork for a second, to avoid the "fatigue" symptom, and then return it to the ear. Tones higher than c-5 are usually tested with whistles or the Monochord. The Edelmann-Galton and the Schaefer-Galton whistles are the prefreable ones, and these are supposed to produce tones as high as 18,000 to 20,000 d.v. The difficulty with the whistles, however, is that, first of all, it is hard for the patient to distinguish between the actual tone and the sound of the air going through the whistle. Secondly, whistles are easily impaired, so that accuracy of tone is not obtained. Thirdly, it is difficult to get either uniform pressure with the bulb, or to produce sufficient pressure needed for the very highest tones. However, as a rough estimate, whistles serve very well. The Schaefer-Struychen Monochord has a range of about 500 to 20,000 d.v., and possesses the great advantage that the highest tones can be tested both by air and by bone conduction.

The lower tone limit is usually raised in diseases of the conduction apparatus; and the upper tone limit is usually lowered as soon as any involvement of the perception apparatus occurs. If, later, there is further impairment of the inner ear, the hearing for all tones—high, middle and low—is diminished.

Quite a number of tests have been devised from time to time besides the Weber, Schwabach and Rinne. Among these are the Politzer, Stenger, Gelle, Bing, and the Lucae-Dennert, etc. Of these the most important are the Weber, Schwabach and Rinne. In determining the simulation of deafness, the Stenger test is extremely useful, but the other tests mentioned are not needed as a rule. The purpose of functional testing is to determine the presence of an impairment of hearing and the degree thereof, as well as to determine the location of the lesion; i.e., whether it is in the conduction apparatus, the perception apparatus or in both. For these purposes the Weber, Schwabach and Rinne are most essential.

For some years audiometers of various types have been used considerably, but they have not met with the universal adoption which tuning forks have been accorded. Audiometers are calibrated either in intervals of octaves, half-octaves or continuous tone series. In some of the audiometers for office use the range is from C (64 d.v.) to c-6 (8192 d.v.). In the largest audiometer

the range is from C-1 (32 d.v.) to v-7 (16,384 d.v.). Audiometers possess certain advantages such as permitting accurate quantitative measurements of acuity of hearing and the loss of hearing figured in sensation units; the production of graphs showing clearly the curve of the findings; and the comparison of records with previous examinations or with those of other otologists. In certain modified forms they are also valuable for the detection of malingering.

Various objections have been raised to audiometers, such as their high cost, their lack of easy portability, the fact that there is still some difference in the calibration of the various types of audiometers, and the fact that the curves obtained do not always indicate the exact type of lesion present. In general, we may say that as instruments of precision, audiometers are very useful, and that for research purposes they are certainly very valuable. Let me emphasize that when tuning forks are properly calibrated, and supplied with the "constant of decrement," the same curves can be obtained with them as with an audiometer, but if a number of pitches are used, it requires more time to carry out the test.

The Gelle test is used for the purpose of seeing whether fixation of the footplate of the stapes is present. On compressing the air in the external auditory canal, the ossicles, including the stapes footplate, are pushed inward, and in normal cases the hearing for the time is temporarily diminished. A hard rubber tip connected with a Politzer bag by a piece of tubing is inserted airtight into the auditory canal, a vibrating tuning fork is placed either upon the head, the tubing or the bulb of the bag, and any change in hearing noted during compression. Normally the hearing is diminished during the compression, and returns when the pressure is released. If there is a fixation, however, changes in pressure do not affect the hearing. The test is rather unreliable, for it is difficult to get an airtight occlusion of the auditory external meatus, and secondly, unless the patient is very intelligent, it is difficult to obtain satisfactory statements regarding a change in the hearing.

The Stenger test is used for the detection of simulation of total unilateral deafness. Two forks of the same intensity and pitch are employed, usually the a-1 (435 d.v.) or the c-1 (256 d.v.). The test is based on the fact that sound entering one ear "masks" that entering the other ear from a greater distance. The patient is blindfolded during the test. In a normal individual if one fork is held, let us say, closer to the right ear than it is to the left, the individual will hear the sound only in the right ear, because it is the louder, and masks the sound entering the left ear. If the simulator pretends that he is totally deaf in the right ear, we find at which distance (let us say eight inches) he hears the fork in the left or good ear. With that fork now sounding ten inches from the good ear, the other fork is brought closer to the right ear, for instance, a distance of four inches. The simulator then really hears the sound only in his right ear but dares not admit it. Not knowing that the fork is also sounding at the left or good ear, he states that he does not hear anything at all, and thus is trapped.

Recording of Functional Tests: There has always been great difficulty in devising a method for recording the tests so that the information therein contained would be readily accessible to and understood by all readers, as well as to give a reliable index of the findings for the examiner himself. With some slight modifications, we have employed the acoumetric formula adopted at the Eighth Otologic Congress in Budapest in 1909, and have combined it with the diagram long used in the Vienna University Clinic. With either of these methods it is easy in a few moments to record the tests and have all the information available in a small, compact space. Many otologists develop for themselves schemes which seem adequate, but it is highly desirable that some method be designed which would be understood by readers throughout the world.

Hearing Aids for Impaired Hearing: For many years mechanical non-electric aids were used. These consisted in the main of hearing tubes or horns or shell-like appliances. The purpose was in the main the collection of sound waves and the direct transmission to the ear by way of the air in the external auditory canal. From the practical standpoint they served very well, but the main objection to their use arose on the part of the patients, most of whom were disinclined to carry them about and to insert them into the ear when conversing.

The electric hearing aids originally had no attachment for hearing by way of bone conduction, but in latter years this feature has been supplied, and has served a great purpose. The disadvantages of the electrical hearing aids are first that

often adventitious sounds are produced which are disturbing to the patient; secondly, that it is necessary to carry about on the person a battery, a microphonic type of receiver and an ear piece; thirdly, this type of apparatus is quite expensive. On the other hand, it is possible by means of a rheostat to increase the intensity of sound suitable for the individual involved.

As a general rule, one may state that where there is a far advanced auditory nerve degeneration, the electrical hearing aids are of practically no assistance to the patient. In those cases, however, where the bone conduction is good or even relatively increased, the electric hearing aids are highly serviceable. In otosclerosis and other middle ear conditions in which the bone conduction is good, the attachment for the bone is of immense benefit. No patient, I believe, should purchase an electrical hearing device without first having a good opportunity for testing the same with eyes closed in order to see whether an improvement in hearing really results. Stimulated by the work of Harvey Fletcher some years ago, great efforts are now being made to build these electrical aids in accordance with the type or range of the impaired hearing. In a word, to have the electric aid which will amplify mostly the pitches which are impaired in the individual.

Conclusions: In testing of the function of hearing, all aids should be employed. The observation of the patient with reference to his attitude, efforts at lip reading, loudness of his voice, etc., examination of the ear, nose, nasopharynx and pharynx should be carried out. Although the voice cannot be standardized, if unaccentuated whisper or conversation is employed with proper precautions a practical estimate of the hearing ability is obtained. This, together with the history of the patient, the use of the tuning forks, especially for the Weber, Schwabach and Rinne tests, will enable one to make a diagnosis relative to the location of the hearing lesion, if any.

With various audiometers, graphs are obtained showing the loss of hearing figured in sensation units. This may likewise be done with tuning forks when supplied with the "constant" of decrement. For practically all work in determining the location of the lesion, etc., merely a few good forks are sufficient. For the highest tones neither the forks nor audiometers suffice, and the Edelmann-Galton Whistle or, better still, the Monochord is needed.

Audiometers are also very useful, and especially for research work. Each type of appliance, fork or audiometer has advantages and some disadvantages, but all the important information can be obtained by correlation of the history of the patient and the examination outlined above. By means of the voice and a comparatively modest instrumentarium all the essential hearing tests may be done.

180 North Michigan Avenue.

DISCUSSION

Dr. Joseph C. Beck, Chicago: A presentation by Dr. Sonnenschein on the functional tests of hearing is all that need be said as to clarity and usefulness in his description of well-known accepted tests of hearing. There are no new tests of hearing except the audiometer, perhaps, but the new thing would be if the men would use the old tests that are so well established. That is my criticism—that we do not make the tests—and when are made, many times not with the principles of physiology of hearing in mind, as outlined by Dr. Leshin. The graphs made from the audiometer compared with those made with tuning forks are valuable, but the one difficulty is that it takes too much time. People do not want to take the time to make an accurate test it seems, and if this is not done the test is of no value. The practibility must be considered.

In the description of tests of hearing it is said in the paper that the finger placed in the ear is enough to exclude the opposite ear. I want to differ from that. When you take a patient and plug up the ear with the finger or anything else, and then go on testing with the voice you will find a tremendous difference in the result you get in that test if you mask the ear by rubbing the auricle or use some voice apparatus. What interests me is the tests for malingering, of which I have had a great deal of experience at Hines Hospital, where we are trying honestly to ascertain what a patient is entitled to in claiming to be deafened. We find the finest make-believers; we have a great deal of trouble with all the various tests, in trying to actually pin them down as to what their hearing is. When the perfected lie detector is permitted to be used in institutions we will have the best detector of malingering. One of the best practical tests when you have a patient who says he does not hear is to take a half-dollar and drop it on some hard surface when he is not looking. It is hard for him not to turn around to see where and what it is that dropped.

Regarding hearing aids, you know how the opticians and optometrists have put themselves forth in the minds of the public as to the value of making proper examinations of eyes—so it is with hearing devices. We hear the merchants advertise that they will make a test of hearing before selling a hearing aid, and they use the audiometer, which I am sure was never planned for that purpose. The majority of people who buy these costly articles receive no benefit, because they have no hearing for that kind of an apparatus. It should be emphasized that we have a great aid for these

markedly deafened people in lip reading. That will give them more help than all these apparatuses, and lip reading is one great advance in the education of these unfortunates of recent years.

DERMATOPHYTOSIS OF THE FEET, HANDS AND GROINS

Clinical and Therapeutic Consideration Emphasizing the Stages of Infection

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Fungus infections have insidiously advanced in the field of medicine until today they are a major problem which must be met by every physician. The individual physician is primarily concerned with the treatment of this affliction. He wants a treatment regime which may be adapted to all stages of the infection and exact information regarding its application. This paper will offer proven therapeutic procedures for dermatophytosis of the feet, hands and groins, emphasizing particularly the fundamental importance of treatment directed towards the stages of infection. A short, concise review of our present knowledge regarding the etiology, clinical pathology and symptomatology of dermatophytosis will be presented first as a basis for its treatment.

Etiology. While the primary cause of dermatomycosis is, of course, the mould fungi, with a complicated mycology and pathology which few but botanists remember, it is of particular importance to realize that this infection is due to fungi.[1] We are dealing with a fungus and not a bacterial infection. Disregard of this fact is responsible for clinical confusion and therapeutic failures because the fungus organisms, their pathology and treatment, are entirely different from bacteria. Therapy must be directed towards the peculiarities of the mould fungi.

Epidermophytosis is today probably the most prevalent affliction we have to encounter. Its incidence ranges from zero in young children to almost 100% in college athletes.[2, 7] At the University of California, of 3,405 Freshmen, 51.5% of the men and 15.3% of the women were clinically positive for ringworm.[3] Similar figures were obtained at the University of Pennsylvania when, of 1,073 patients, 529 or 59.7% were infected.[4] 10% of all skin diseases in a German clinic are due to fungi while they constituted 9.7% of the private patients in a dermatologist's office.[5, 6]

Many factors are responsible for the increasing incidence of fungus infections. As Strickler says: "Fungi possess inherent and enormous powers of spread, multiplication, prolonged and hardy life and a tendency towards a resting spore stage of indefinite duration and latent virulency even under adverse circumstances."[4] They do not ordinarily inhabit healthy skin but when once acquired probably are never entirely eradicated even when asymptomatic.[8-12] Fungi are found everywhere, most frequently on and in leather, woolen and silk goods, dark, damp places as swimming pools, bath-rooms, Turkish baths, shower rooms of clubs, gymnaseums and bathing pools and beaches. There is a varying degree of individual and family susceptibility.[13] The social status of the patients seems to have little influence in the spread and incidence of the infection nor does cleanliness ward against infection although the accumulation of perspiration and dirt may cause a quiescent infection to become active.[2, 13, 14]

The common localization to the feet may be explained by excessive perspiration, apposition of skin surfaces and frequent maceration and injury of the skin. The interdigital spaces furnish an ideal environment for the growth and multiplication of fungi because of moisture with a slightly alkaline reaction, pH from 6.8 to 11, furnished by increased perspiration, abundance of food supplied by the hyperkeratotic and macerated skin and increased skin temperature due to confinement of the feet in shoes.[4, 14] Orthopedic problems as misfit, particularly too short shoes, flat-feet and other malposition of the feet, which are a factor in the increase of perspiration, definitely have a role in this problem.[15, 16]

Clinical Pathology. Ringworm fungi, when they inhabit the skin, are located for the most part in the stratum corneum and stratum granulosum or in the outermost layers. They proliferate and grow between the cells of the horny layer and produce a ferment which causes a dissolution of the cells and exerts a toxic effect resulting in definite inflammatory changes which involve the entire skin. There is no basic patho-

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logical difference between the various types of dermatomycosis except degree of intensity of the irritation and inflammation. The severity of the infection seems to be in direct proportion to the depth of tissue invasion and this seems to depend on the variety of the invading organism and is not influenced by the health or resistance of the patient. Fungi have been found in apparently normal skin several inches from areas of evident infection. Also, organisms in spore stage have been recovered from apparently normal skin and beneath the nails many months after a clinical cure.[4, 11, 17, 38]

Symptoms. The average fungus infection commences as a slight peeling of the skin between the toes, especially the fourth interdigital space, commonly termed "scalding" by the patient. Itching may be mild to intense. Irritation and desquamation from scratching produces a serous oozing which causes white, sodden, macerated epithelial debris of varied thickness. Or there may be a slight, dry peeling of the skin with mild itching and no maceration. This chronic, intertriginous stage may persist for years without the patients realizing they possess a definite disease.

Initiating the fungus attack, or at any time during the course of a chronic infection, there may be an acute, inflammatory, vesicobullous variety. Crops of vesicles appear between and over the toes, along the sides of the feet, in the soles and occasionally around the malleoli. These may be deep or superficial, often only mildly inflammatory, mostly small, usually not uniform in size and exhibit a tendency towards clustering or grouping and spreading by peripheral extension forming circinate edges showing marginal activity. The vesicles are multilocular. They rupture early due to scratching and the condition changes to the dry, squamous type. The lesions have a gradual onset, show various stages of activity, have a bilateral but seldom symmetrical distribution and show a resistant course. In the soles and thicker skin surfaces where the vesicles are not readily ruptured variously sized groups form and extend under the surface in abscess-like clusters until eventually the entire sole may be undermined. Secondary infection may produce lymphangitis with abscess formations on the dorsa of the feet and regional adenopathies.

The nails and periungual tissues may become involved and, due to paronychial inflammation, the nails become grooved, pitted, discolored, colorless and lusterless and usually thickened because of heaped-up debris under them. When the inflammation has subsided, there is very little discomfort to the patient beyond the appearance of the nails.

Direct spread from the toes by the hands causes involvement of the groins, perineal regions and scrotum. These lesions vary from a slight vesiculation, oozing and scaling between the thighs and the scrotum to extensive raised, infiltrated, vesicular and pustular, scaling, erythematous patches extending down the thighs and onto the abdomen. These are sharply marginated, intensely itching and foul smelling. This variety, called tinea cruris, is common in men and is occasionally seen in women.

Fungus infections of the hands resemble closely those of the feet; the hands are usually secondarily involved from the feet. There may be superficial scaling, usually between the fingers with slight or no itching. Vesicles may predominate as scattered or closely grouped superficial lesions along the sides of the fingers or deep-seated, hard, shot-like involvement of the palms, closely resembling pompholyx. Dry, scaly, slightly raised. fissured patches in the palms, dorsum of the hands or along the sides of the fingers, with or without outlying small vesicles and usually only mildly pruritic, often classified as eczema, are usually due to fungi. The nails and paronychial tissue involvement resembles that of the toes.

Toxic, allergic or sensitization reactions to local infections may produce a variety of eruptions called trichophytids. These are chiefly located on the trunk and extremities as pink or reddish, slightly scaly papules with a tendency to grouping. Rarely there may occur erythematous eruptions resembling erythema multiforme and toxic dermatoses, which may be accompanied by fever, anorexia and general adenopathy. Trichophytids are considered to be caused by both a direct dissemination of attenuated organisms by external transference and by the spread of the fungi or their toxins through the blood stream. Fungi are not found in these lesions.[18-20] They usually accompany acute, vesicobullous lesions although relative insignificant eruptions,

either superficial or deep, may produce an extensive trichophytid.[4, 21] Some authors consider all vesicosquamous lesions on the hands in which fungi cannot be demonstrated microscopically or culturally as trichophytids while others affirm the existence of lesions called pompholyx or dyshidrosis due to toxic causes other than fungi. Trichophytid eruptions usually disappear upon the eradication of the primary foci.[22-25]

Differential Diagnosis. A differential diagnosis between fungus infections and similar cutaneous eruptions is of extreme importance because the therapeutic approach to each condition is usually more or less specific and failure with treatment often results unless each condition is treated by its correct regime. The following brief outline will list the outstanding characteristics of six entities which may be confused with ringworm. As a rule these lesions can be differentiated clinically.[22]

1. *Bacterial Infections:* Vesicular, pustular and squamous eruptions on the hands and feet which are due to bacteria are usually of two varieties. One, in which the vesicles are grouped, small and superficial with the subsequent formation of erosions and superficial crusts, is impetigo caused by streptococci and contaminating staphylococci. These lesions usually occur on the sides of the feet and around the malleoli and on the dorsum and sides of the fingers. The other variety is the ordinary staphylococci infections forming ecthymatous, pyodermic and furuncular lesions. These are unresponsive to therapy as outlined for tinea but readily heal under bacteriocidal preparations as bichloride of mercury soaks and ammoniated mercury ointment.[26]

2. *Dyshidrosis or Pompholyx:* Vesicular and vesico-squamous lesions occur on the hands and feet as toxic manifestations of causes other than fungi. These are systemic dyshidrosis or pompholyx and are characterized by deep, uniform-sized, non-inflammatory, sago grain-like, unilocular vesicles which usually appear simultaneously in one symmetrical crop or eruption and which burn rather than itch. They may coalesce into large bullae which undergo, as a rule, secondary pyogenic infections. They are of short duration and disappear in a few days with mild desquamation. There is no tendency for circinate or polycylic configuration. The treatment is directed towards the underlying toxicity.[22]

3. *Dermatitis Venenata and Eczema:* External irritants may produce acute and chronic lesions which, particularly on the hands, are very difficult at times to differentiate from mycotic eruptions. The skin responds to irritation by the formation of closely packed, small, superficial vesicles situated on inflammatory and infiltrated bases. These rupture with the formation of denuded areas of the skin and considerable serous exudation. If the irritation is prolonged, the acute venenata becomes a chronic eczema manifested on the skin as dry, scaly, fissured patches. These eczemas have a predilection for the dorsa of the feet, hands and fingers in contradistinction to the fungus infections which are usually on the plantar and palmar surfaces.[22]

4. *Pustular Psoriasis:* Pustular psoriasis, always considered an extremely rare condition, is being reported with increasing frequency due, not to an increase in occurrence, but because it is more frequently recognized and diagnosed. The primary lesions of pustular psoriasis on the hands and feet are tiny, flat, superficial, yellowish pustules which dry to form characteristic brownish, intraepidermal scabs. These, for the most part, occur in patches although they may arise singly in normal skin. There also occur reddish patches covered by varying degree of scaliness usually situated symmetrically on the thenar and hypothenar eminences of the palms and on the central parts of the soles. The nails are sometimes involved with a peculiar pitting. Typical psoriatic lesions may usually be found elsewhere on the body. These lesions are extremely unresponsive to treatment.[27-30]

5. *Acrodermatitis Perstans and Dermatitis Repens:* This extremely chronic, infectious dermatitis, which usually involves the extremities, may be confused with mycotic infections. It usually begins on a toe or finger as an unilateral and localized traumatic sore or suppurating paronychia. The elementary lesions are intraepidermal abscesses which unite to form visible vesicles, bullae and pustules. The nails become dystrophic, thickened, furrowed and often destroyed. There is peripheral extension producing denuded, excoriated, reddened areas

surrounded by detached epidermis forming overhanging edges. This condition is extremely resistant to all forms of therapy.[26, 39]

6. *Syphilis:* The varieties of cutaneous syphilis requiring differential consideration from tinea of the hands and feet are maculopapular, papular and papulosquamous secondary and late annulopapular syphilids. High lights in the diagnosis of these individual syphilitic lesions on the hands and feet may be listed as follows:[40]

a. No vesicles—if vesicles are an essential part of the eruption in an adult, it is not syphilis.

b. Polycylic, gyrate and "broken-circle" configuration.

c. Absence of itching.

d. Presence of induration—the lesions of syphilis are in the skin, not on the skin.

e. Indolence—tendency towards chronicity and mildness.

f. The annular papular forms frequently are unilateral.

g. Nail changes are rare.

h. Tendency to dull color.

AIDS TO DIAGNOSIS

1. *Microscopic Examination for Fungi:* The mould fungi can readily be detected by microscopic examination particularly in lesions on the feet. Pieces of skin, preferably caps of vesicles, scrapings of sodden, white skin from between the toes or the most active appearing areas of any suspicious lesion, are placed in several drops of 20% to 30% potassium hydroxide solution on a microscopic slide and covered with a cover-slip. This is allowed to stand two or three hours, occasionally adding solution by allowing drops to run under the cover-slip to prevent drying, until the keratin is completely dissolved. The preparation may be gently heated to hasten dissolution but never boiled vigorously. When the pieces of skin are entirely soft, the cover-slip is gently pressed down on the slide until all possible solution has been expressed and the preparation is as thin as possible; the solution is usually absorbed with blotting paper as it seeps from under the cover-slip. If the skin cells are pressed to one-layer thickness, the fungus mycelium and spores may be readily identified under the microscope.

2. *Cultural Growth of Fungi:* The fungi grow rapidly at room temperature on dextromaltose media but few offices require or are equipped for this procedure.

3. *Trichophytin Skin Tests:* Pathogenic fungi produce specific immuniological phenomena which may be used for their detection and treatment. A ringworm infection causes the formation of specific resistance or antibodies. If the patient has or has had tinea, these antibodies react with the active principle of pathologic fungi or trichophytin when this antigen is applied to the skin by patch, scratch or intradermal methods with the production of inflammatory wheals or patches. When this occurs, the test is considered positive. If the patient does not have or has not had ringworm, there are no antibodies to react with the antigen, there is no inflammation and the test is negative.

The exact reliability and value of trichophytin as a diagnostic aid is still undecided. It unquestionably is an aid to diagnosis but its limitations must be kept in mind. These are the possibility of remote former infections causing positive reactions, false positive reactions due to bacterial contamination of the solution, reported occurrence of negative reactions accompanying lesions definitely known to be due to tinea, the trichophytin antigen itself causing false positive reactions in later tests, debatable specificity of the reaction and possibility of untoward symptoms as urticaria, hay-fever, eczema and general systemic disturbances which may follow its use.[21-23,39] Others affirm the value and specificity of the trichophytin test since it is now shown that both superficial and deep lesions are responsive, that the contaminating bacteria in the solution may be destroyed without harming the antigen and that small dilutions are more reliable and less dangerous than those formerly used.[4, 21, 24, 31, 32]

The practical deduction to the diagnostic value of trichophytin is that it is not required for the routine diagnosis of trichophytosis as this condition can usually be diagnosed clinically and by microscopical examination. It is of value as an aid in the diagnosis of the disputed case.

TREATMENT

After several fundamental principles are understood regarding the treatment of dermatophytosis, its management is more or less routine. These may be listed as follows:

1. Therapy must be directed towards the stage of the infection, mild treatment for acute stages, medium treatment for subacute stages and severe treatment for chronic stages. The routine use of one or two prescriptions for all

stages may produce results in a small percentage of cases but the majority will be aggravated or unaffected. The main consideration is not to use strong medications for the acute, vesicular stage.

2. Adjust the medications as the stages of the infection change. Gradually increase their strengths as the condition improves but do not hesitate to return to mild preparations when there is an exacerbation or recurrence of vesicles. This may be necessary several times before the stronger prescriptions will eventually effect a cure.

3. Continue treatment several weeks after apparent clinical cure and advise application of medicines to the apparently normal skin several inches beyond evident infection in an endeavor to destroy spores and permanently eradicate the disease.

4. Personally clean the lesions, daily if possible, by opening all vesicles, trimming away all dead skin and involved nails and instruct the patient to do likewise on the days an office visit is impossible that the medications may reach the organisms.

The following routine will be effective in handling the fungus patient if it is adjusted, as indicated by the stage of the individual infection:

1. For the acute, vesicular, oozing, inflammatory stage:

a. When there is acute inflammation and it is necessary to quiet down a venenata produced by too strong self-medication, use only boric acid soaks or compresses:

℞ Sat. Sol. of Boric Acid.

Sig.: Use as soaks one-half hour four times daily or as continuous compresses.

b. Whenever there are vesicles without too much inflammation or the inflammation has been controlled, the following modified Burrow's solution is indicated:

℞ Copper Sulphate	4.0
Zinc Acetate	20.0
Liq. Aluminum Acetate q. s. ad	240.0

Sig.: One tablespoon to each pint of water as warm soaks. One preparation may be used repeatedly. Vaseline or cold cream may be applied between soaks for burning or tingling.

c. For the groins, a calamine and zinc lotion generally gives relief in preparation for stronger medications:

℞ Prepared powdered Calamine	16.0
Zinc Oxide	16.0
Glycerin	16.0
Rose Water q. s. ad	120.0

Sig.: Mop on areas as desired.

2. For the subacute stage:

a. When there are only a few vesicles, as the initial treatment or following the subsidence of the acute stage, a mild Whitfield's ointment may be used.

℞ Salicylic Acid	1.0
Benzoic Acid	2.0
Rose Water Oint. q. s. ad	30.0

Sig.: Apply between toes as vesicles subside. When vesicles have disappeared, apply night and morning.

b. When there are no vesicles, in an endeavor to decrease perspiration, the mild Whitfield's ointment may be applied at night and the following dusting powder during the day:

℞ Salicylic Acid	1.5
Boric Acid	25.0
Starch	10.0
Talc q. s. ad	120.0

Sig.: Dust on feet during day.

3. For the chronic stage:

a. When the lesions are squamous, dry, fissured and hyperkeratotic, stronger medications are indicated. It is advisable, before applying medications, to actually remove the thickened corneum by rubbing with sandpaper. This immediately promotes a smooth, soft, pliable skin and is very satisfying to the patient. The following crude coal tar ointment is indicated for this stage and it may contain from 3% to 6% of salicylic acid depending on the keratolytic properties desired.

℞ Crude Coal Tar	2.0
Zinc Oxide	2.0
Starch	4.0
Anhydrous Lanolin	
Petrolatum aa q. s. ad	30.0

Sig.: Apply continuously to dry areas.

b. The following prescription is useful for extremely resistant areas and for routine application around the toe-nails:[36]

℞ Iodine crystals	0.6
Potassium iodide	1.0
Salicylic acid	1.0
Alcohol (50%) q. s. ad	30.0

Sig.: Paint on areas at night. Apply dusting powder during day.

4. For prophylaxis:

It is generally advisable for the patient to take the following precautions against a continued reinfection and to guard against new infections:

a. Wear a freshly boiled pair of cotton, preferably white, socks daily.

b. Fumigate shoes and bedroom slippers by placing them when not being worn in a closed box or can which contains a saucer of U. S. P. formaldehyde. The leather absorbs the formaldehyde fumes and, when worn, furnishes additional treatment for the skin.[37]

Roentgen rays unquestionably are of value in the treatment of fungus infections in all their stages and, when available, are used with the various medicinal procedures. Successful and permanent cures are possible, however, without their use.

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EUGENICS AND ITS RELATION TO THE COMMUNITY

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Every individual coming into the world has an inalienable right to be well born. Being well born, for the purpose of this discussion, means the possession at birth of two most precious attributes: good bodily health and a sound mind.

The needs of these qualifications are self-evident. In the first place, life in this twentieth century has become very complex: its needs become greater and greater, competition becomes very keen making the race of life more difficult and a place in the sun harder to attain. This concerns especially, the individual. In the second place, the community and State is in need of in-

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dividuals who are self-reliant, self-sustaining, right thinking and dependable. Particularly is this true of a republic such as our own where every citizen bears an equal responsibility in the maintenance of our free institutions and where every defective becomes a burden. Thirdly, life for everyone is a struggle for existence; not only for the man who earns his living by hard daily toil, but also for those who have great wealth and appear to have a life of ease. This struggle in some respects is different, but every one is exposed, in a greater or less degree, to climatic and atmospheric changes as well as to contagious disease and epidemics, which at various times in the history of civilization, have swept over the world.

These things being apparent, we must grant the need of being well born. The child has nothing to say about his advent into the world; he is here on no volition of his own, a bundle of possibilities or a bundle of liabilities, all depending upon inherited characteristics and what may be done with them by wise or foolish parents. It has sometimes been said that in order that one might be an outstanding success, he should be able to choose his grand-parents, his ancestry. Splendid if that were possible. Now let us see what he would require. From one he would arrange to derive the characteristic of thrift and industry; from another, honesty and integrity; from another, loyalty and courage; from another, common sense and good judgment; all of which, with a sound body, would make up the ideal citizen. The ability to choose one's ancestry is obviously impossible. Therefore, it follows that to promote the health and general welfare of the community, prospective parents should give careful thought to matters pertaining to their own health and, in choosing a mate, select one who might in all probability produce healthy offspring. The old saying that "like produces like" is positive and as unassailable and fixed as the laws of the Medes and Persians which, you will remember, changed not.

Galton made a careful study of the laws of inheritance. He concludes that the child derives one-half its total heritage from its parents, one-fourth from its grand-parents, one-eighth from its great grand-parents, etc., the more remote ancestors contributing less and less. These interesting researches contribute much to our knowledge of the matter but do not help to solve the difficulty of choosing one's ancestors and also seem to explain, in a way, the reason why highly gifted parents rarely beget children who are equally fortunate in their natural endowment. Therefore, given an individual who has good health, sound healthy bodily organs and a sound mind, his offspring will, in all probability be good, useful citizens of the community.

There is another side to the picture; it is a well known fact that certain diseases are directly transmissible while in others, the tendency to acquire a disease, is transmissible. In the first group mentioned, we have two most important: syphilis and alcohol. First syphilis, which may be directly transmitted by a parent. In these cases, nature tries very hard to prevent the birth of syphilitic babies and we find mothers having frequent miscarriages at the second, third, fourth, sixth month, etc. In some instances, after many miscarriages, a child may be born who soon succumbs and dies from his infection or to some malady to which he is subject. Others may grow to maturity and suffer throughout their lives with some form of nervous disorder; various anemias or a complete mental overthrow, in many instances producing an individual who becomes a ward of the state. Secondly, alcoholism plays a very important role in the health of the community. While alcohol is a useful servant, a product for which it would be difficult to provide a substitute, alcoholism is a dangerous and a deadly enemy of society. Everyone is familiar with its disease breeding, vice producing influences on the individual, making him, in many instances, totally oblivious to his duties to the family, his friends or to society. Perhaps less is known of its terrible effects on future generations. However, it might be interesting to cite one well known instance with which many are familiar: the Jukes family which lives in the State of New York, was descended from a drunken father and an imbecile mother. Twelve hundred individuals, including seven generations of this family were studied. Of this number, approximately one thousand were known to be anti-social in their behavior; every form of criminality being found, ranging from petty thievery to murder—many being mentally defective. This family cost the State of New York more than a million dollars. Besides this

vast sum which was paid by the tax-payer, it would be impossible to estimate what it cost the various communities, in which they lived, in grief and distress over a murder or other major criminal act.

In the second group, we again know certain families have a tendency to acquire certain diseases. While the disease may not be directly transmitted, there may be certain inherited organic weakness. We see in this group, cancer, diabetes, tuberculosis in families, cardiac disease, a tendency to develop arteriosclerosis, apoplexy, etc. All have seen many instances of these just cited. The problem is not only a community or a State affair, but of great importance to the individual and now, what can be done about it? David Starr Jordan has said that a good citizen is one who is able to take care of himself and then has something left for the common good and, to repeat, a republic such as ours is in great need, at all times, of good citizens. Every one knows of the burden we carry in our public institutions, our prisons, our State Hospitals, homes for the feeble-minded and epileptic; their population showing a much greater increase than is shown in the remainder of the community. The care and instruction of this group is enormous.

This situation is not alone peculiar to our own country but, according to Lord Horder, in England one person in one-hundred and twenty is feeble-minded; one in two hundred is insane; one in ten too dull or sickly to be employed in various industries. The average level of human intelligence has been shown to approximate fourteen years. Eugenics, in its final analysis has to do with an effort to raise this level of intelligence by improving the stock, that is: by improving the health, physical and mental, of parents. Improvement of the stock or the germ from which the human being springs is, of necessity, a slow process. In the mating of human individuals, normally little is thought of future generations, emotion being the guiding spirit, while judgment has but a still small voice in the transaction. We know how carefully the farmer and those who grow animals for pets, select those from which other individuals may spring. We also know how scientifically they study the laws of inheritance and how well they know how many singers they may expect when a Hart's Mountain warbler is crossed with a canary that does not sing, all according to Mendel's law of inheritance. Other means used are first: education, and by education is meant not only teaching those things one's ancestors knew and believed, but also a liberal training which may become the basis of reasonable thinking and sound judgment. Second; a healthy environment is essential. Living conditions, food, clothing and housing are of vast importance. The crowding of slum districts, where vice and its twin sister disease reign, can and should be eliminated. Increasing the number of city playgrounds, enlarging the parks, making provision in every way possible for healthful out-of-door surroundings.

It seems at this time, that it is impossible to breed a super-man. No matter how carefully selection may take place, the descendants sooner or later, revert to the intelligence level of the community. However, there can be no doubt that education and instruction of young people in the knowledge of the laws of inheritance and the influence of certain disease processes, would, in a few generations, vastly improve this human stock. Any progress made must, of necessity, be slow but if we may be reminded of the profound ignorance and superstition prevalent during the middle ages and indeed, more recent times, then view in retrospect the more recent splendid scientific achievements, some of which have made many important discoveries matters of common knowledge, it can not be unreasonable to hope that in the next half-century, the average level of community intelligence could be raised one, two or three years.

Eugenics then is the science which teaches the control of the reproduction of the unfit and encourages the better types to greater fertility. It is a problem of many sides and many angles and while the approach may seem difficult, with common sense as the guide, much can be accomplished. The proper control of the syphilitic and the alcoholic would be a long step in the right direction. Parents should be prompt to recognize nervous instability in their children and to take steps to properly instruct and guide their growing minds. Several states have passed laws providing for the sterilization of the habitual criminal and the criminal insane about which much could be said. This seems to be a

step in the right direction. Finally, the individual should be informed of the few precepts just enumerated and taught that, for his own present good and the good of the community, he should learn something of the story of the human race.

THE COMMITTEE ON MATERNAL WELFARE

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EVANSTON, ILL.

The safety of women in labor in the best hospitals in this country is as great as in similar institutions anywhere. The maternal mortality rates in our well organized clinics are equal to those of obstetric clinics in any country. The mortality accompanying pregnancy and labor in the country in general, none the less, remains higher than it should be. It is, perhaps, not altogether fair to compare maternal mortality rates in small, compactly settled and well organized countries, like Sweden and Norway, with those of our immensely greater and much younger land. In these smaller lands no community is far from a teaching clinic or at least from a competent consultant. In some portions of our own country large, thinly settled areas are found with hospitals far apart and with few or no physicians of special obstetric training. Single states may vary widely in the efficiency of obstetric care provided for their women in different counties. These variations will be reflected in the maternal and infant mortality statistics as they appear in the reports of their boards of health. The ideal remedy for this condition would be to provide, in every community, expert obstetric attendance and well equipped hospitals in which women in labor may be cared for. This ideal state of affairs will not arrive for a long time but gestation and labor will continue.

Some attempt must be made to improve the present conditions while we wait for the changes which time will no doubt bring. For many years, in any event, most of the women in the majority of our states, will continue to be cared for by general practitioners. It is not fair to demand of the man in family practice the same familiarity with and skill in the handling of all the obstetrical problems which are sometimes presented. He must also meet medical problems in many other fields, and the incessant demands upon his time, if he is a successful practitioner, make a minute knowledge of any special field impossible. In many communities, in our own state as in others, the general practitioner may be compelled to meet situations which would tax the skill of the specialist in his fully equipped hospital, assisted by a trained personnel. Without special knowledge, lacking trained assistance and the material resources of a hospital equipped to deal with obstetric emergencies, he cannot be too greatly criticized if, in some cases, his results are not ideal. He must, however, have sound fundamental knowledge of obstetrics and realize not only what it is wise to do but also what it is unsafe to attempt.

Hospitals of the highest type, that is, those which are used as teaching centers and therefore are staffed by men of special training, may achieve a high degree of safety for women in labor. A small number of such hospitals in our own state were found to have an average maternal death rate of 0.25%. Another group of good hospitals, not used for teaching, the obstetric work in which was done by groups of men in general practice, had an average maternal mortality of 0.38%. The average maternal mortality of our state is not as good. Certain counties have exceedingly favorable mortality rates while others have rates which are far too high. In the past three years (1933-1935, inc.) nine counties had no death ascribed to pregnancy or labor. These were all counties in which the number of births was comparatively small. The rate in different counties varies widely, the highest being 1.34% per thousand. The average for the entire state over this period of three years was 0.48% per thousand. This is an improvement over the rate for the state for the five-year period (1928-1932) which was 0.56% per thousand.

The American Committee on Maternal Welfare has been organized to try to help the doctor in his obstetric work and in so doing to reduce the maternal loss of life and to decrease ill health following pregnancy and labor. This Committee is made up of representatives from the American Gynecological Society, the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, and the Section of Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association and many other interested organizations. The Chairman of the National

Committee is Dr. F. L. Adair. It is hoped that in every state there may be a state committee with a state chairman and with a membership chosen from various parts of the state, these members being men who are interested in obstetrics. The majority of states have such committees which in many have been active for a number of years. In most of the states this committee is an official one of the State Medical Society and is affiliated with the American Committee on Maternal Welfare. The Illinois State Committee hopes to aid the physicians of the State to raise the standard of obstetrics in the State in the following ways.

1. To function as a liaison committee between the medical profession and State Board of Health in its maternity program.

2. By furnishing speakers to discuss obstetric subjects at meetings in various parts of the State.

3. Outlines of lectures upon important topics may be furnished upon which members of county societies may themselves construct helpful talks.

4. Series of lectures may be given by teachers from the obstetric departments of medical schools who may, if possible, spend several days in one town or a number of towns.

5. Pre-natal clinics may be organized by the local profession for the care of women who are unable to afford proper care during pregnancy.

6. Collection and compilation of statistical data relating to obstetrical patients will give opportunity to plan preventive measures for the future.

It is far better for the medical profession to attack the problem of obstetric mortality and morbidity itself, and to give definite evidence of an intention of correcting our present deficiencies ourselves, than for change to come from some source outside our own profession.

The membership of the Illinois State Committee is as follows:

Dr. Joseph B. De Lee, Chicago
Dr. William E. Cooley, Peoria
Dr. Floyd Heinemeyer, Rockford
Dr. Paul Fox, Oak Park
Dr. Ralph Reis, Chicago
Dr. W. C. Danforth, Evanston, *Chairman*
Dr. O. H. Crist, Danville
Dr. E. E. Davis, Avon
Dr. H. C. Blankmeyer, Springfield
Dr. Milton E. Bitter, Quincy
Dr. Dale D. Smith, Decatur
Dr. H. G. Horstman, Murphysboro
Dr. Thos. B. Williamson, Mt. Vernon
Dr. J. T. O'Neil, Ottawa

We ask the cooperation and interest of those physicians in the State of Illinois who are doing obstetrics and we hope the entire profession may approve the work which the Committee proposes. A moderate amount of money will be available from the State for the payment of speakers and for traveling expenses. This will be expended with the approval of the Health Commissioner of the State. In these days when one hears occasionally the threat of state medicine it is wise for medical men themselves to meet as many of the medical problems of the people as possible, thus anticipating action which might later come from some other source.

636 Church Street.

A CASE OF SYPHILITIC PANCREATITIS

WALTER S. SIEWERTH, M. D.
CHICAGO

Clinically the recognition of syphilitic disease of the pancreas is often difficult, because the symptoms usually resemble those of some nonspecific lesion, as is also often the case of syphilis of the other upper abdominal viscera, at times resembling an acute surgical abdomen. Gumma of the pancreas not infrequently presents gastric symptoms, may be slight jaundice, often a palpable mass, which may or may not be painful, also at times some loss of weight, giving it the appearance of a malignancy.

Wartlin has demonstrated that syphilis is a common cause of interstitial, interlobular and interacinar pancreatitis, and recognized the fact that gummas of the pancreas are rarely encountered, and that the diagnosis is difficult because of the inconstancy of the symptoms. In 1921, Wile was able to collect only ten cases from the literature in which complete recovery followed the administration of antisyphilitic treatment in patients suffering from syphilis of the pancreas. Maegot Franke of Germany, in December, 1926, reported a case of gumma of the pancreas, found at post mortem, in a case of left lobar pneumonia; the diagnosis was not made while the patient was alive.

Menninger of Topeka, Kansas, makes the statement that, congenital syphilis undoubtedly is a cause of diabetus mellitus in children in a large majority of cases.

This case, which I feel is of interest to report, is at present alive and working at his occupation.

On February 15, 1936, in the morning I was called to see a man, 44 years of age, about 5 ft. 10½ in. tall; weight at this time 164 lbs. He was very ill with a large carbuncle on the back of his neck with only a very small drainage opening, had been sick for 5 days in bed and appeared very toxic, with a great deal of pain at site of carbuncle.

Past History: the usual childhood illness; no operations.

Family History: no history of diabetes in the family, father-in law died with tabes. Nothing else relating to the case.

Venereal History: Both G. C. and lues denied.

Marital History: Married for 15 years; no children and no history of miscarriages from his wife.

Occupation: Salesman. Patient was admitted to the Lake View Hospital that morning with a temperature of 101½, P. 110, R, 26.

Urine: Sp. Gr. 1030, acid, clear; sugar, 4 plus; trace of albumin; diacetic acid and acetone present. Blood sugar; 222 mgms.

Blood test; Wassermann 4 plus and also Kahn 4 plus, R.B.C. 4,800,000, W.B.C. 13000. Hemo, 86%, normal differential. Patient was very drowsy, but had been taking 4 to 6 allonal tablets daily for the past 3 days. He was given 20 units of insulin t.i.d. and operated on the next day under nitrous oxide anesthesia. Crucial incision with drain inserted and moist 1-3000 bichloride dressings applied every 6 hours.

He was given increasing doses of insulin with proper diet until 60 units of insulin were given t.i.d. before his urine was sugar free and then the dosage of insulin was gradually reduced. This, with heavy doses of potassium iodide intravenously and per mouth, and also mercury and bismuth injections intramuscularly. He left the hospital after 3 weeks with a normal blood sugar, and taking only 2 units of insulin once a day before breakfast, up to April 14, when the urine was negative and remained so after discontinuing the insulin but still taking antiluetic treatment. Carbuncle was entirely healed by March 20, 1936, and patient went back to work at that time. He feels fine and his weight at present is 183 lbs.

He tests his urine 1½ to 3 hours after each meal and since April 14, 1936, has had no return of sugar in the urine, with a normal blood sugar and is receiving antiluetic treatment as specified. The carbuncle had the appearance of a tertiary lesion, however no mass was evident near the pancreas or anywhere, no gastric symptoms, no jaundice, so that I feel I was dealing with a syphilitic pancreatitis and not with a gumma of the pancreas. This patient never had any cord or brain symptoms, spinal puncture was advised but not accepted.

After close questioning, when the findings were positive, patient admitted a sore on the genitals 17 years ago, which he states at that time the doctor pronounced non-syphilitic and no treatment other then local was given. Blood Wassermann and the Kahn tests on his wife are negative at present. Spinal puncture has been advised but up to the present it has not been done. The patient was last seen by me to receive specific treatment on June 20, 1936, and is in good health.

CONCLUSIONS

1. It is well to do routine Wassermanns on all cases.

2. All symptoms pointed to a carbuncle with a diabetes mellitus as the underlying cause, which I now believe was a syphilitic pancreatitis.

3. Even after requiring large doses of insulin to begin with, it was only a comparative short time under specific treatment that insulin was no longer necessary.

4. And lastly this man is again useful to society and able to go back to his occupation.

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Lake View Hospital.

DR. JOHN ZAHN, PIONEER GERMAN-AMERICAN PHYSICIAN

CLARENCE A. EARLE, M. D.

DES PLAINES, ILL.

The subject of this paper was not an example of the traditional country doctor. He took no interest in local, state or national affairs. Nor did he discover anything new in medicine or surgery. I am presenting this sketch of his life because of his extremely unusual personality and character and because he does illustrate a type of early German physician that some of us older American doctors used to meet but which now has all but disappeared. I refer to the attitude of many of the early German medical men toward American trained physicians and the almost contempt in which they held everything medical in this country.

Dr. John Zahn, son of a Lutheran preacher, was born in Pomerania, January 1, 1835. He passed his gymnasium and came to America. He fell in with Dr. Theodore Hoffman of Niles, Cook Co., Illinois, who helped him through Rush Medical College, where he graduated in March, 1863. He practiced a while with Dr. Hoffman and also in Caracas, South America, and then

located in Elgin. An Elgin druggist told me that he had a large practice, writing 75 to 100 prescriptions a day. It was his custom to spend a few months every few years in German universities. He studied in Jena, Tübingen, Vienna and Rostock. Sometime in the seventies, while practicing in Palatine, he married Ernestine Mergler, a daughter of Dr. Mergler, of Wheeling, Illinois. Dr. Mergler was a graduate of a Bavarian university. Another daughter was Dr. Mary Mergler, widely known years ago as a gynecologist and professor in the Woman's Medical College in this city. From all reports Ernestine Mergler was a most talented, cultured, and beautiful woman. The circumstances of her marriage to Dr. Zahn and the outcome of this marriage are so unusual that I shall give it as I got it by word of mouth from their mutual friend, Dr. Hoffman. It must have been on his return from one of his European trips that Dr. Zahn landed at Dr. Hoffman's home in Niles; and without much ceremony he told the doctor that he must have a wife, and asked him if he would loan him a horse and buggy to go up to Wheeling to Dr. Mergler's. The doctor said, "Certainly." The result was his marriage to this beautiful, talented Ernestine Mergler. After the festivities following the marriage ceremonies were over and the guests had departed, with a wave of his hand, he said to his wife. "You go to your room and I'll go to mine." They never lived as man and wife. Some months later she got a divorce.

He continued to practice at Elgin, Palatine, or Niles. Late in the eighties he had accumulated enough to provide for his future and he left for Germany, there to end his days. He was in Germany in 1890. In August of that year the 10th International Medical Congress met in Berlin. One day at one of the general assemblies every member found a twenty-four page pamphlet in his seat. The title of this pamphlet was, translated into English, "Student, College and Doctor in the United States," by Johannes Odontius. It was a most sarcastic, ill natured attack on student, colleges and doctors of this country.

He states, at the very beginning, that his object for publishing the article was that the Berlin University had announced that the possession of a transatlantic diploma would not entitle the possessor to matriculate in their university and it was his hope that other universities, after considering his article, would follow the example of Berlin.

Time will not permit me to give much of what his pamphet contained. On page one he says that "While the vast majority of the transatlantic members of this congress are ignorant of German institutions, working methods, etc., nevertheless each one of these gentlemen has an easily compiled 'paper' in his pocket with which he expects to invigorate the obsolete European Science." Let me mention that Lusk, Parvin, Senn, Wood and Billings were members of this congress. In another place he says that if the founders of Mormonism hadn't injected polygamy into their articles of faith that it might have become the national religion of the New World. While much of what he said was probably true, the time and place of its distribution; its biting, sarcastic, vindictive spirit were barbarous. It must have been as embarrassing to the German members of the Congress as it was humiliating to the American members.

Early in 1891 he met and married a daughter of a German pastor. As I stated, he had saved enough to care for himself but not enough for a family, so back to America he came, locating in Barrington, where his only child was born. His old clientele flocked to him again. During his last sojourn in Barrington I had located at Des Plaines. Because he was so widely known I had to call him into consulation now and then. He had the reputation of calling on any doctor's patient when summoned and of throwing the attending physician's medicine out of the window. The first time I met him was at a case of pleurisy in a young man who was hit by a plow handle. He continued to run a little fever and I thought there was a little effusion. One day the father told me that Dr. Zahn would be there the next day to see his boy. I drove to the station with horse and buggy, expecting to take him out to the case. He hardly noticed me and refused to ride with me. He got into the open milk wagon with the farmer, although it was raining. I led the way to the patient's bedside. With a somewhat haughty air, he said, "Are you through with your examination?" I said, "Yes, excepting the introduction of the needle." With characteristic self assurance he

proceeded to percuss the chest. Because of the small amount of fluid the impaired resonance was not very striking. As he went over the chest again and again his confidence faded and looking up to me he said, "You don't say anything, doctor." I said, "You haven't asked me anything." Finally he said, "Try your needle," which I did. He became more friendly and rode back with me to the station. On the way back he confessed that he expected to find that I didn't suspect what was the matter with the boy and he was going to humiliate me in the presence of the family. At another time after seeing a case I took him to the station. I noticed a neighboring doctor also waiting to take the train. I said, "Let's go and speak to Dr. ———." He refused and with a look of disgust remarked, "How can you speak to him?" He will be the subject of my next book."

In a comparatively short time he accumulated some more U. S. bonds and with his family returned to Stuttgart, where he died in 1915.

After his death I had some correspondence with his wife and in 1925 visited her in Stuttgart. Apparently time and physical weakness had not lessened his combative spirit but a residence of twenty years in Germany after he had lived in the U. S. had changed his attitude toward America.

It seems that some time during his residence in U. S. he had taken out naturalization papers. His wife told me that after the breaking out of the Great War, the German Government got after him to renounce his American citizenship. This he absolutely refused to do. He was compelled to report at intervals to the authorities until he got so weak he couldn't go. Before his death he made definite arrangements for his funeral. One of his last requests was to have the U. S. flag on his coffin. This to me is significant. I have lived all my life among foreigners. I have known hundreds of Europeans to come to this country and amass wealth but I have never known half a dozen to go back and live permanently in the fatherland. I recall a Danish couple who sold their farm in Iroquois Co. and went back to Denmark. They were gone but a few months when they returned. Questioned by the druggist for whom I was working they said that "Denmark wasn't what it used to be." The druggist said, "Denmark is what it was but you are different." A few years ago a neighbor of mine sold his belongings and went back to Germany. He was back in less than a year. Some one who knows foreign life better than I do may be able to explain this.

Dr. Zahn's personal appearance belied his preverse nature. He was of medium height and erect in stature. He was always faultlessly dressed. His features were classical. His beard and bushy hair were kept trimmed by a certain barber in Chicago. His English was perfect without a trace of foreign accent.

SECURING PERMISSION FOR AUTOPSIES

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The importance of obtaining autopsies on deceased patients should need no emphasis for those who are to seek permission. A half-hearted appeal not backed up by the seeker's firm conviction of the humanitarian and scientific value of post mortem examination is almost certainly doomed to failure. First, then, those who want autopsy permission should give the definite impression of filmly believing in its worth.

Relatives Pleased. The petitioner, however, should realize that consent is allowed in direct proportion to the feeling of the relatives of the deceased that everything possible in the line of treatment, care and attention was done for the patient before death. The relatives must be made to feel confidence in the whole hospital personnel and the work it is doing. In other words, they should feel obligated by the fact that hospital employees and attaches have gone out of their way to leave nothing undone that might have been of aid.

Let us look at some of the ways in which this feeling may be engendered. It must be remembered that a discourtesy on the part of anyone, however remote from the immediate welfare of the patient, will create an unfortunate impression. A polite and deferential doorman, an information clerk who is more than automaton, an elevator operator who gives courteous, helpful directions, a maid who has a cheery, solicitous manner, a technician who is careful, alert and sympathetic, all these contribute to the general

good impression that quite possibly would tip the balance in favor of consent.

Nurses' Role. A little more apparent is the role played by the floor superintendent of nurses and the floor nurses in winning the good will of the relatives. These employees have more contact with the case and the impression of service that they give is therefore somewhat more noticeable. The special duty nurse can be exceedingly helpful. Her contact with the case is practically constant; if she is astute, she learns to know the family and their idiosyncrasies very well. She herself should be thoroughly convinced of the scientific necessity and efficacy of an autopsy. Often a favorable, well chosen word at the appropriate time from her will turn the tide favorably for the solicitor.

Internes Importance. The internes' duty toward creating a concessive attitude on the part of the relatives is quite manifest. Extra time spent with the patient over and above that required by the medical aspect of the case pays excellent dividends in securing a permit. Particularly should he be present or immediately available during the last few hours of life. In such a time of strain for the relatives, the intern who has given constant attention and sympathy has done much toward soothing and placating them, paving the way for the request.

House Physician. Analogous to the role of the intern is that of the house physician. His added experience and his position of responsibility in the absence of the attending physician as well as his acquaintance with the case make his availability and helpfulness extremely important. Often he is the person designated to secure permission and his success will be dependent on the favorable impression he has made.

Family Physician Paves Way. The family physician and the consulting physician, if one be present, know the case thoroughly and often are quite well acquainted with the family and their possible attitudes. Even if neither one of these men is present to make the request for autopsy, they often can outline an approach to be used by the one who is to seek authorization. With tact and diplomacy the way may be paved by the family physician.

Plan of Procedure. Having made efforts to establish this feeling of cooperation on the part of the relatives, let us consider the possibilities of a plan of procedure.

Never Leave to Chance. The responsibility of asking for necropsy permission should be clearly defined and unmed. It should not be left to chance, that is, just anyone who happens to be present at the time the request should be made.

Someone Responsible. With this in mind many hospitals have found it feasible to make the house physician directly and solely responsible. His availability and his intimate knowledge of the case make him especially well fitted for this task.

In other instances the full time pathologist is designated for the all-important role of petitioning the relatives for signature on the permit. His years of experience, his thorough conviction of the importance of autopsies, and his position of authority well equip him for the assignment of making the request for consent to examination.

Often the attending physician is well adapted to the task by reason of his dignity, his tact, and his personal knowledge of the case and of the psychology of the family. If he is to undertake this duty, he should make a distinct effort to be present or readily available at the time of death or immediately afterward.

School of Instruction. Should the responsibility be allotted to internes, it is of utmost necessity that they be entirely cognizant of the importance of autopsy examination and that they be thoroughly instructed in the essentials of the procedure. Frequent meetings should be held for instruction and discussion to be presided over by the pathologist, the hospital superintendent, a senior attending physician or someone of equal authority and experience. An informal airing of specific problems at these meetings will often bring forth distinctly helpful contributions to methods of approach.

Notify Relatives. With the responsibility of the role of petitioner established, it is well for him to remember the importance of notifying relatives of the patient's critical state. This notification should be adequately prompt to allow ample time for reaching the bedside of the patient and for adjustment on the part of the family to the idea of the imminence of death. This makes the succeeding attempt at securing permission for post-mortem examination a little less of a shock to the bereaved family. A straightforward statement of the patient's condition in a tactful manner is best made by the resident physician. This can well be accompanied by a

courteous offer of extended visiting privileges. This offer, often anticipating the relatives' wishes, does much to instil an appreciative attitude.

General Essentials. Now let us enumerate the general essentials to be considered in making the request. In general and wherever possible this request should be made in a quarter to a half hour after death. The initial shock of bereavement will have subsided somewhat and the time has come for the material arrangements that are necessary. The doctor should unostentatiously and quietly ask as few of the family as possible to come with him to a room apart from the patient's room, remembering that his chance of success is almost always inversely proportional to the number of persons interviewed. This room should be apart from the normal hospital activity and the doctor should make every effort to separate from the minds of his audience a feeling of the presence of sickness and its connotations of unpleasantness. Whenever possible only the person whose signature is required should be present. It is much easier to convince an undecided individual when all extraneous suggestions and attitudes are absent.

Working the Plan. The solicitor should present an appearance of dignity, sympathy and a genuinely helpful attitude. The conversation is best opened by asking questions about the case. From both the questions and their answers can usually be found a basis for the request. In discussing the case the doctor should be especially careful to use non-technical language without too obviously doing so. He should let the relatives be aware of his assumption of a good deal of intelligence and enlightenment on their part. A great deal of harm can be done by seeming to talk down to the level of his listeners and much good will can be engendered by giving them the feeling of intellectual parity.

Tact—Diplomacy. In this interview it is of vital importance not to give the impression of haste. The doctor should take time to explain all treatment and answer all questions carefully with a subtle obviousness in his carefulness. It is time well spent, for it is important in results procured. Each case presents a psychological problem in itself; as the interview progresses, the solicitor should analyze this problem and then on the basis of his analysis he is to select the appropriate argument or arguments. It is wise to anticipate and answer all possible foreseen objections before they are voiced, thus creating a positive rather than a negative attitude. The fact that few objections can be raised by the relatives often makes them unconsciously feel that they are not being persuaded against their will. It is unwise to use the terms "autopsy," "necropsy," "post mortem," because of their unpleasant connotations in the lay mind; the phrase "examination of the body" should be substituted.

Above all, is it important never to seem to exert pressure. Although we use the analogy of the salesman, who is good because he believes firmly in the worth of the product he is selling, to emphasize the importance of the conviction of the necessity of autopsy to be successful in obtaining permissions, nevertheless, we do not borrow his "high pressure" methods but instead assume a quiet, convincing, dignified demeanor quite without overt pressure.

Valid Arguments. With the interview well under way we shall next consider arguments that may be used in its course. In general, the more specifically applicable to the case in question the argument can be made, the more efficacious is that argument likely to be. One of the most telling appeals is based on the necessity of autopsy for filling out insurance papers. The autopsy is a positive proof of claim in the case of a policy with certain limiting features. The autopsy furnishes conclusive information in a very short time that will expedite insurance payments in general—often a very important phase that can be tactfully suggested. In the case of an accident or other exigencies of a medicolegal aspect which require suit to be brought, a thorough proof of the cause of death as established by autopsy is invaluable.

If the case is one with a familial or hereditary tendency or even the suspicion of it, the autopsy may contribute valuable information that will have a bearing on the well being of the posterity in the family. This point can be amplified according to the conditions of the case. At times lay curiosity can be discreetly turned toward some unexplained factor in the patient's disease or condition which could be established at autopsy. The solicitor would do well to present the autopsy idea from the point of view of an ordinary "operation" done after death to help others instead of an antemortem one to aid the patient. The examination can be construed as a

courtesy extended free of charge by the hospital. Had the patient died outside the hospital and for one reason or another an autopsy desired (but not required by law—coroner's case), there would have been a fee of from twenty-five to fifty dollars. Necropsies are not at all unusual and are often requested by the deceased himself before death. In many countries they are required by law. Many outstanding men have been examined after death: Columbus, Napoleon, Lincoln, Garfield, McKinley, Calvin Coolidge are examples.

Value to Science. As human beings the relatives have a duty to humanity in general. Their consent to the autopsy procedure will further medical knowledge and give aid to scientific research which has been endowed but cannot proceed without the background of knowledge based on autopsy findings. Vital statistics which are exceedingly important in any public health measures affecting individuals, communities and countries, are valuable only in direct proportion to their validity. These statistics are made valuable when they are based on the accuracy that is provided by the exactness of reports confirmed by autopsy. If the disease is really rare, the relatives would be letting an exceptional opportunity for study slip by withholding their permission. If the treatment of the disease is in the process of development, an autopsy would serve as an excellent means for the evaluation of the treatment, in finding out how far it was successful and where it failed. And finally, the relatives may be made to feel that they are giving the deceased an opportunity to carry out in death the generosity and thoughtfulness of the welfare of others that he so constantly displayed in life.

Counterarguments Answered. The family will of course present counterarguments. A few of them with their logical answers are here anticipated and set down:

"Let someone else do it." Progress would be cut short if everyone took that attitude. It is only by the knowledge obtained in the past that we have progressed as far as we have in the present. It is the family's solemn duty to help the future.

"The body will be disfigured." The examination is done by means of a surgical incision which later is carefully closed just as if it were an operation. The procedure enhances the appearance of the body as it drains out the blood, prevents purpling by clotting and permits better circulation of the embalming fluid.

"It is a mutilation to the body." It should be regarded as an operation which would certainly never be refused on the grounds of mutilation.

"This is just an ordinary case and nothing can be learned from it." Correlating clinical symptoms with the pathological findings at autopsy is always important. No one can predict what great observation or discovery might be made on the most routine piece of work. There is much left to learn even about the normal human body.

"The deceased would not have consented." The deceased would probably have been more than eager to help others who suffer and are afflicted as he was.

"The deceased has suffered enough." This examination would cause him no pain. But it is quite likely through your consent to aid thousands of others who are suffering and will suffer as he did.

Religions Favor Scientific Progress. "Our religion forbids autopsies," is a statement long past obsolete. In the case of the Jewish religion many eminent Jewish leaders including Rabbi B. L. Levinthal, Dr. Jacob Z. Lauterbach and Dr. Charles D. Spivak, have given full approval to post mortem examination. They maintain that an examination to help others is an honor rather than an indignity to the dead.

Monsignor D. F. Dunne of Holy Cross Rectory says: "An operation after death for the purpose indicated—the furtherance of scientific knowledge—I can see nothing which offends the respect and reverence which the Church has always demanded for the body, whether living or dead. It is needless to say that proper consent must always be obtained."

It would be well to contact Protestant leaders in a community, for here again the minister enjoys the trust and confidence of the family. A remark from him favoring a post mortem examination may weigh the balance for permission.

Rt. Reverend George Craig Stewart, Bishop of Chicago, in this connection says, "From our point of view there are theologically no objections. If a body be reverently operated upon after death, I can see no difference between that and a reverent operation during life, providing always, of course, that the reason for the operation is purely scientific research."

Undertaker. Another member of the com-

munity whose favorable attitude is all-important is the undertaker. His good-will may insure future permissions. His assurance to the family that the appearance of the body will not be altered often wins a consent. To guarantee the undertaker's good-will, strict cooperation with him is essential. There must be a definite specified time for delivery of the body agreed upon followed by scrupulous promptness in that delivery. The undertaker's task is expedited by prompt delivery of the death certificate. Care should be taken to restore the body to the condition as near normal as possible. Conferences to iron out difficulties should be frequent and subject to call by either the doctors or the representatives of the undertakers.

CONCLUSION

A lively interest in autopsies by all concerned should be sustained. To increase the number and percentage of autopsy permissions is the object of this paper. The plan is outlined. Let's work the plan. The result can be nothing short of success. The science of the great healing art, "Medicine," is thereby assured of enhanced and continued progress.

Much of the material herein was obtained from reprints and pamphlets by the American Medical Association, the "library service" of the American Hospital Association, and letters in answer to inquiries from the following hospitals: University of Minnesota, Minneapolis; Barnes, St. Louis; The Grace, Detroit; The California, Los Angeles; St. Luke's Chicago; Massachusetts General, Boston; Henry Ford, Detroit; Michael Reese, Chicago.

Read before entire Staff of Woodlawn Hospital, Chicago, June 5, 1936, as a contribution to stimulate additional interest in raising autopsy percentage.

INCAPACITATING CHOLELITHIASIS IN A MALE AGED 20

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This case report calls attention to the fact that cholelithiasis may exist in young people with incapacitating results. An unfounded view is prevalent that this disease belongs to middle or late adult life, but gallstones have been found at all ages from infancy up and even in fetuses.

In this case, attacks of right upper quadrant abdominal pain began at the age of seventeen years. They were accompanied by nausea and vomiting. They gradually increased in frequency until they became daily occurrences, making it impossible for the patient to work. At operation, on December 2, 1935, in the St. Francis Hospital, a cholesterin stone about 12 mm. in diameter was found impacted in the cystic duct. A small amount of mucus and gravel was found in the cavity of the gall-bladder. Cholecystectomy was followed by uneventful recovery, and the young man is now enjoying excellent health.

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THE MEDICAL SIGNIFICANCE OF UNRECOGNIZED PERFORATED PEPTIC ULCER

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Until very recently perforation of a peptic ulcer was looked upon as a fatal catastrophe unless recourse was had to operation. For centuries the post-mortem repeatedly attested to the fact that a ruptured ulcer resulted in death, that when a patient recovered from an acute abdominal illness which clinically resembled perforation the original diagnosis was questioned and generally abandoned. Since spontaneous recovery of the patient in the presurgical period precluded the possibility of demonstrating the presence of a ruptured ulcer the teaching that a perforation was invariably fatal became axiomatic. Even the astute German clinician and pioneer gastroenterologist, Leube, stated when perforation occurs the only treatment in most cases is to induce euthanasia. More recent authorities were so deeply imbued with the precepts of the older clinicians that no other possibility than death in cases of perforation not operated on was even entertained.

In 1921, Dr. R. T. Vaughan and I began to use the x-ray to demonstrate the presence of pneumoperitoneum in patients presenting the picture of perforated ulcer. The ease with which free air in the peritoneal cavity could be visualized led us to employ the x-ray in cases

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of acute abdominal pain where the clinical diagnosis was doubtful or obscure, as well as in the examination of patients with the classical picture of ruptured ulcer. In the course of our study we learned that the presence of a spontaneous pneumoperitoneum in a patient with a compatible history was pathognomonic of perforated peptic ulcer. This belief has been confirmed by subsequent experience with several hundred cases which we have observed and by the studies of others. (See Vaughan and Singer.[1, 2])

A certain number of patients who had evidence of spontaneous pneumoperitoneum and a history compatible with ruptured ulcer were for one reason or another not operated upon but nevertheless made an uneventful recovery. Generally the cause for omission of surgery was refusal of the patient to submit. At the time of admission to the hospital, the hyper-acute symptoms of onset had subsided and the patient was relatively comfortable. As a matter of fact, several of the patients argued that since they withstood and survived the intense pain, the residue of mild pain which could in no way compare with the agony of onset would not hinder recovery. They, therefore, concluded that they did not require operation. Most of these patients proved correct for they left the hospital in a few days fully recovered from the perforation.

The conclusions drawn from our x-ray studies lent support to the observations made during the course of a concurrent clinical study. With regard to spontaneous recovery from perforated ulcer, we had noted from time to time, patients who at laparotomy showed incontrovertible evidence of recent perforation, i. e., food particles in the abdominal cavity but in whom no actual opening could be found by the surgeon. In spite of closure of the abdominal wall, without drainage of the peritoneal cavity, these patients generally recovered. In other instances a recent, closed-off perforation was demonstrated at operation, the sealing resulting from coagulated fibrin or from plastic exudate agglutinating the stomach with a tag of omentum or with the liver or the gallbladder. In many of these patients the adhesions were not disturbed and the operation was ended as an exploratory one. Nevertheless, the patients generally recovered, having withstood not only the effects of the perforation but also the shock of the surgical procedure. In still other cases the occurrence of spontaneous recovery was proved by errors in diagnosis on the part of the surgeon. For instance, a diagnosis of gallbladder disease is made in a patient with acute upper abdominal pain and a conservative policy followed. A week or ten days later, following the subsidence of the signs of acute inflammation, laparotomy is undertaken with the intention of extirpating the gallbladder. To the astonishment and chagrin of the operator the biliary apparatus is normal and evidence of a recent, closed perforation plus an organizing peritonitis is found. It frequently happens that a patient recovers from an appendectomy performed through a lower right quadrant incision where the history is one of violent, sudden pain at onset. The surgeon encounters an appendix in which the inflammation is limited to the serosa and also a thin, turbid, bile-stained fluid in the abdomen which he fails to recognize as gastroduodenal leakage. Appendectomy is performed and the abdomen closed without drainage. Nevertheless, many of these patients whose upper abdomens were not visualized at laparotomy recover from the perforation in spite of the appendectomy.

Based upon our studies both x-ray and clinical, we gained the distinct impression that perforation of peptic ulcer with spontaneous recovery was a rather common event. In order to obtain some idea of the relative incidence of recovery without operative closure of the ulcer I made a careful search among all the patients with atypical abdominal symptoms admitted to the Cook County Hospital during an eighteen month period beginning with the spring of 1928. I succeeded in collecting forty patients in whom the diagnosis of ruptured ulcer seemed warranted and in whom spontaneous recovery followed. (See Singer.[3]) During the same period of time seventy-three perforations were readily recognized and operated upon or came to autopsy. Assuming for the sake of argument that none of the patients who were treated by surgery would have survived if operation were omitted, the percentage of patients who recovered from perforation spontaneously is still quite substantial. It should be borne in mind that the overwhelming majority of the patients who recovered without surgery had small perforations with limited leakage such as will be described later.

The idea that perforations which prove benign do so by virtue of the fact that the leakage occurs slowly and thereby allows sufficient time for barriers or a sac to form was soon dispelled by evidence accrued from our studies. The term "slowly leaking ulcer" is a myth and should be deleted from medical texts. Practically all actual perforations take place suddenly and instantaneously and furthermore the rupture occurs into the free abdominal cavity and not into a preformed sac. The barriers which form about an ulcer, *follow* and do not precede rupture. The walled-off abscess found in connection with perforated ulcer represents an attempt on the part of nature to circumscribe escaped infectious material which suddenly entered the peritoneal cavity. The evidence for the above statements is obtained from x-ray, surgical and clinical sources. With the fluoroscope it is observed that air which is released from the stomach soon after perforation is invariably found *free* in the peritoneal cavity. With change of the patient's position the gas shadow can be made to shift to any portion of the abdomen. If the opening of the ulcer communicated with an enclosed, preformed sac, the air would remain localized and fixed in one position.

Evidence against the assumption of a preformed sac is adduced also from the surgical side. Whenever a patient is operated upon for a so-called subacute or slowly-leaking ulcer the exudate and adhesions judging from their appearance are of the same age as the perforation as determined by the date of onset of violet pain. This observation indicates that the adhesions in the neighborhood of the ulcer represent the reaction of the peritoneum to the irritating fluid which actually escaped from the stomach or duodenum. From the clinical standpoint also, evidence for sudden rather than subacute perforation is available. In a study of twenty-five patients with perigastric (including subphrenic) abscess of ulcer origin studied by Dr. P. Rosi and myself[4] we were able by pertinent questions to elicit a history of sudden, annihilating, more or less diffuse, abdominal pain at the onset of the illness in twenty-four. Many patients failed to volunteer the information relative to the onset of symptoms since a period of comparative comfort often intervened between the initial violent symptoms and the subsequent manifestations caused by the abscess. Many of these patients were believed to be suffering from "silent" or "subacute" perforations simply because the examiner failed to inquire into the early symptomatology. We, therefore, concluded that with few exceptions ulcers which perforate do so abruptly and that extravasation occurs into the free abdominal cavity.

In attempting to classify the cases, we realized that the clinical picture immediately following the onset of perforation is more or less constant. However, after the initial manifestations of rupture occur the picture becomes diversified. In some instances, the symptoms are quite fulminant and the patient fails to recover from the state of shock initiated by the rupture. Death frequently occurs within a few hours. In a second group the picture is of the classical type, i. e., a progressive suppurative peritonitis which proves fatal within a few days. In a third group, the violent pain and the marked tenderness and rigidity gradually abate after a day or so and only mild symptoms persist for a variable period. Spontaneous recovery, preceded frequently by surgical evacuation of an abscess, is quite common in this group. In still another group, viz., the fourth, the intense symptoms of onset are followed within one to a few hours by rapid abatement of symptoms and early complete spontaneous recovery.

The only logical explanation for the different clinical pictures in the post-perforative phase of the disease is the variability in the quantity of extravasated fluid which enters the free peritoneal cavity and the rate of entrance. In some instances where the perforation is a large one, there is a veritable gush of gastroduodenal content into the abdominal cavity the instant rupture occurs. The amount of extravasated material is large and the rate of escape is very rapid. At the other extreme is the pin-point to pin-head sized hole which permits leakage of only a very small amount of thin liquid at a greatly retarded rate. The situation with regard to the symptomatology, course and prognosis of ruptured ulcer is somewhat analogous to that observed in coronary thrombosis in that, other things being equal, the symptoms following onset and the outcome are determined by the size of the vessel which is occluded. The smaller the vessel the less persistent are the symptoms of onset and the earlier is the recovery and conversely, the larger the

caliber of the involved vessel the more serious is the catastrophe.

Where the diameter of the perforation is quite small, nature attempts to limit the leakage by sealing off the aperture. Consequently, after a minimal quantity of extravasation has occurred, the fibrinous exudate coagulates and covers or plugs the adventitious gastroduodenal opening or else aids in attaching a neighboring structure or viscus to the defective site of the serosa. The soiling of the peritoneum although accompanied by violent symptoms is readily coped with by the protective properties of the peritoneum. As a result, the symptoms of peritonitis are of only brief duration and a few hours following rupture the signs of inflammation are practically absent. If the patient is seen for the first time a number of hours following rupture, instead of presenting the classical picture described in the text-book, he will appear relatively comfortable, except perhaps for momentary sticking pain felt on motion. Physically the patient will present only slight to moderate tenderness and rigidity limited to one abdominal quadrant. The temperature, pulse and respiratory rates are likely to show little if any change from the normal. Since the usual picture of a diffuse, progressive peritonitis is not encountered shortly after perforation in the cases with minimal leakage but is more or less effaced and difficult to recognize, Dr. Vaughan and I[5] have applied the term *"forme fruste"* to designate the chief difference from the classical description. All transitions between the fulminant and *forme fruste* types occur, the quantity and rapidity of leakage being the determining factors. It may be worth while to reiterate that the symptoms of onset of all types of perforation are more or less identical with the possible exception that the larger the perforation, i. e., the greater the initial peritoneal soiling, the more intense are the symptoms of shock. However, this is only relative. The symptoms following the occurrence of perforation are the important ones in deciding the type of rupture, prognosis, etc.

The value of a knowledge of the facts pertaining to perforation of peptic ulcer with spontaneous recovery should be apparent to every medical man. In the first place, the added information enables him to avoid misdiagnosis at the time of and immediately following rupture. Secondly, it permits the physician to recognize certain complications and sequelae which would otherwise defy elucidation. In the early stages, particularly if the patient is not seen in the first day of the post-perforative course a non-surgical condition such as acute gastritis, acute cholecystitis, gastric crises of tabes, pneumonia, diaphragmatic pleuritis, coronary thrombosis, etc., is frequently diagnosed. Since spontaneous recovery often ensues and operation is not performed, the original diagnosis is never questioned. In former years acute alcoholic gastritis was a frequent diagnosis at the Cook County Hospital in patients with an alcoholic breath, acute upper abdominal pain, tenderness and rigidity. Accordingly, these patients were treated conservatively and frequently recovered. Since learning about spontaneous recuperation from perforation we have been operating upon those alcoholics who present suggestive evidence of an acute condition in the abdomen and generally find a *forme fruste* perforation. I shall not enter at this time into the question of the direct and differential diagnosis of ruptured peptic ulcer in the early post-perforative stage, as I have covered the subject relatively recently in another publication.[6, 7]

The chief purpose of my present discussion is to bring to the attention of the profession one phase of ruptured ulcer that I previously neglected to deal with, viz., the complications and sequelae of perforation not operated on followed by spontaneous closure. A brief consideration will suffice. During the stage of complications the presence of an intra-abdominal abscess proves baffling unless the history of a previous rupture is obtained. If the patient presents himself for the first time two or three weeks after rupture he is likely to omit the story of sudden, atrocious pain unless specifically questioned. In the series of twenty-five cases of intra-abdominal abscess studied by Dr. Rosi and myself,[4] we succeeded by pointed interrogations in obtaining an accurate account of previous symptoms of acute perforation in all but one patient. In the routine histories, however, only an occasional chart included any reference to the acute pain of onset.

The errors in diagnosis include thoracic, retroperitoneal and pelvic as well as abdominal and general affections. When sharp, stabbing pain synchronous with respiration and referred to the shoulder region appears and is associated with an audible and palpable friction rub, acute fibrinous pleuritis is generally diagnosed. The

exudate, however, is chiefly subphrenic and is of ulcer origin. Due to collateral inflammatory edema, a subphrenic abscess frequently becomes associated with a supradiaphragmatic serous effusion. A pleurisy with effusion is then diagnosed and since thoracentesis yields a clear fluid, the thought of subphrenic suppuration is completely dismissed. Upward displacement of the diaphragm due to free intraperitoneal air plus a certain amount of meteorism leads to compression of the lower pulmonary lobes, limitation of excursion of the lungs and to an increased respiratory rate. With the presence of fever due to the residual infection the picture of pneumonia is closely simulated.

There are a number of local and systemic diseases which are erroneously diagnosed when the cause of illness in reality is an intra-abdominal complication of perforated ulcer. Gallbladder disease is frequently assumed when a subhepatic abscess or phlegmon is present. A cholestectomy is performed unnecessarily, since the gallbladder is merely the innocent victim of infection per extension. Abscess in the lesser peritoneal cavity following perforation of a posterior wall ulcer generally directs the clinician's attention to the pancreas or to the spine. Perigastric abscess is often mistaken for a new growth of the stomach or colon particularly when the infection is of low grade and associated with marked granulation tissue production. In addition to local (intra-abdominal) manifestations, unrecognized perforation may lead indirectly to systemic symptoms of sepsis. A liver or other abscess, produced by a perforated ulcer which healed spontaneously may give rise to chills, fever and sweats and defy diagnosis until disclosure at the operating or post-mortem table. The author has observed a patient who presented himself four days after the onset of acute abdominal symptoms. Perforation of an ulcer was not recognized and a dissecting aneurysm of the lower thoracic aorta incorrectly diagnosed. The patient was discharged but soon returned with the picture of sepsis. A streptococcus viridans was cultivated from the blood stream. Subacute bacterial endocarditis was assumed. At autopsy a recently sealed perforation of the posterior wall of the stomach was found and an abscess in the lesser omental sac which was the source of the septicemia. The endocardium was free from change. Naturally, metastatic suppurative lesions also occur.

The sequelae resulting from unrecognized perforated peptic ulcer which are of interest to the diagnostician are attributable to adhesions occasioned by organization of exudate. When the newly formed fibrous tissue involves the distal end of the stomach atypical and bizarre x-ray deformities of the pars pylorica are produced These lesions are frequently diagnosed malignant and laparotomy undertaken at a most inopportune time and in cases where operation is not indicated. Where the exudate which becomes organized is located caudad to the stomach, for instance, in the cul-de-sac of Douglas, loops of small intestine participate in the adhesive process and intestinal obstruction is the consequence. Unless the diagnosis of ruptured ulcer was made at the time of perforation the etiology of the obstruction will probably remain a mystery.

The question of treatment of perforated peptic ulcer does not fall within the scope of this paper. Nevertheless, a word of caution should be sounded. The fact that spontaneous recovery frequently follows rupture with minimal leakage does not mean that medical treatment is being recommended for perforated ulcer. Operation is never omitted except in the management of *forme fruste* rupture and then only if the patient is seen for the first time late in the course of illness and effective closure of the hole can be established with a reasonable degree of certainty. (See Singer and Vaughan.[3]) The chief object of this communication is to impart to the medical men particularly, a knowledge of perforations which are not of the classical type in order to elucidate a number of clinical pictures which hitherto generally escaped recognition.

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DISCUSSION

Dr. J. Donald Milligan, Elgin: I think Dr. Singer is to be congratulated on the intensive work he has done on this subject. I do not think there is any more important subject we have to deal with, both as internists and surgeons, than the perforated peptic ulcer. The internist is mainly interested from the diagnostic standpoint. The surgeon is, perhaps, more interested from the treatment standpoint.

I would like to emphasize two points Dr. Singer brought out in his paper. First, is the very important point of a detailed, accurate history. The late Dr. B. W. Sippy, in his training of students and assistants, held the history as one of the most important things we can have in all diagnostic work. His main criterion was: make the clinical diagnosis first and then go to the x-ray and laboratory for confirmatory evidence.

If this is done in these acute cases—I am speaking of the acute cases that come to the internist for diagnosis soon after perforation—if this detailed, accurate history is taken I am wondering if we need the pneumoperitoneum x-ray plate in the acute cases.

However, in the chronic or later cases, where we see the patient two or three weeks or a month later, we need all the diagnostic aids we can get to make a diagnosis.

I would like to ask Dr. Singer one question. How long after the perforation has existed can we expect to find this pneumoperitoneum in the x-ray? How many days, weeks or months in these chronic cases can we expect to find this pneumoperitoneum?

The second important point I want to bring out is the recognition of the partial obstruction of the small bowel. This is very frequently overlooked by men who are examining cases, abdominal cases, for diagnosis. To me, although I have had, perhaps, much more limited experience than Dr. Singer, this is one of the most important complications we have following perforation of the peptic ulcer.

The other complications of which he speaks are very important, but to me the partial obstruction that is formed by the inflammation, the adhesive inflammation going down and pulling up, interrupting the peristaltic wave of the bowel down from the stomach, causing distress, is very important.

Unfortunately, there is no diagnostic way that we can find that obstruction unless it is fairly complete. The partial obstruction is not picked up by the x-ray. It is not picked up by the laboratory. It is not picked up by physical examination. You may have a small partial obstruction with a great deal of distress in the abdomen and no findings whatever except your detailed clinical history that helps you to make this diagnosis.

To me, too many times we go into the abdomen to operate, and we fail to follow the small bowel from the duodenum down throughout, especially the bowel that is around the stomach and that area that may become adhesive with the adhesions from the inflammation. I think that is one of the most important complications that we have following the perforation of a peptic ulcer.

Dr. Singer: (Closing Remarks): During the hyperacute period the diagnosis of perforated ulcer is generally simple, particularly if the patient is seen the first hour or two following rupture. If, however, the patient is not observed until a number of hours after perforation it is often difficult to make the diagnosis from physical signs alone. There are so many affections that simulate perforated ulcer in the later stages of the illness that unless a trustworthy history is obtained the true cause of the symptoms may not be discerned. In those cases where a quesion arises as to the correct diagnosis the demonstration of a pneumoperitoneum, if present, settles all dispute.

The question was asked regarding the rate of absorption of the escaped air following perforation. The gas remains in the abdomen for about five to ten days depending roughly on the amount in the peritoneal cavity. The air is much more slowly absorbed following perforation than after artificial pneumoperitoneum, due presumably to the fact that the exudate on the peritoneal surfaces following rupture, prevents rapid absorption.

I wish to thank Dr. Milligan for his helpful comments and particularly for emphasizing the rôle of unrecognized perforated ulcer in the causation of intestinal obstruction. The obstruction generally results from a pelvic abscess which subsequently becomes absorbed. The escaped gastroduodenal content and the peritoneal exudate gravitate into the pelvis, the infectious material becomes localized and organization follows with resultant adhesions. The clinical manifestations of intestinal obstruction may not appear, however, for months or years after the unrecognized perforation occurred.

I should like to repeat that I am not advocating the medical treatment of perforated peptic ulcer. The object of this talk is to bring to your attention the following facts: Perforated ulcers can and do heal spontaneously; that not all perforations lead inevitably to death; that in the cases which recover spontaneously the perforations are quite small, often minute; that the symptoms are just as characteristic at onset as in the classic rupture; also that when these cases heal spontaneously, several complications and sequelae with indistinct clinical pictures follow; and finally that these complications and sequelae resist elucidation unless the previous unrecognized perforation is discovered through the history.

VALUABLE

Visitor: "Is your son who has just graduated from college a help to you on the farm?"

Farmer: "Yes. If it wasn't fer him the language which I address to the livestock would be turrible ongrammatic."

TREATMENT OF DEMENTIA PARALYTICA: COMPARATIVE STUDY OF COMBINED ARTIFICIAL HYPERPYREXIA AND TRYPARSAMIDE VERSUS THERAPEUTIC MALARIA: PRELIMINARY REPORT

Clarke H. Barnacle, Franklin G. Ebaugh and Jack R. Ewalt, Denver (Journal A. M. A., Sept. 26, 1936), report on a comparative study of combined artificial fever and tryparsamide versus therapeutic malaria in the treatment of sixty cases of dementia paralytica over a one year period. Chemotherapy followed both methods. During this period in the artificial fever series 70 per cent (twenty-one patients) were definitely benefited while in the malaria group 63.3 per cent (nineteen cases) were likewise helped. The serologic reactions of the cerebrospinal fluid in both groups did not parallel the clinical results.

VASCULAR COLLAPSE IN TOXEMIA OF PREGNANCY

According to Fred L. Adair, Chicago, Arthur B. Hunt, Rochester, Minn., and Rupert E. Arnell, Chicago (Journal A. M. A., Sept. 26, 1936), parturitional vascular collapse is a grave condition occurring typically in a rather small percentage of elderly multiparas who have been afflicted with a progressively severe nephritis in succeeding pregnancies. The incidence of this condition in their clinic was 0.2 per cent of all deliveries and 2.55 per cent of all toxemic patients. The toxemia seems to be the most important etiologic factor, with delivery definitely exciting the appearance of vascular collapse. The blood pressure and general condition of cases of severe and chronic toxemia should be watched closely for twelve hours after delivery. Equipment and personnel should be ready for prompt and effective treatment in the event of the collapse of such a patient. The mortality is high, 15.49 per cent of seventy-one cases reported. The condition is an entity deserving of recognition and further study because of its gravity and because proper treatment should reduce the mortality appreciably. The most common pathologic lesion was a chronic glomerulonephritis. The liver lesions in these cases may merit further study. Proper use of hypertonic intravenous dextrose solution forms the basis for effecting recovery from the shock. A secondary partial anuria, associated with hypotension, may require management.

INJURIES OF HAND: CLINICAL LECTURE AT KANSAS CITY SESSION

Sumner L. Koch, Chicago (Journal A. M. A., Sept. 26, 1936), states that the arrest of hemorrhage, the treatment of shock, and the careful examination of the hand—not the wound—are the first steps in the care of an injured hand. The principles involved in the further treatment, as in the treatment of any compound injury, are care not to add injury to that which has already taken place, careful excision of hopelessly injured tissue, the use of a minimum amount of foreign material in the repair of the injured structures, closure of the open wound as soon as it can be done with safety, and rest until healing has taken place.

TRICHLOROETHYLENE INTOXICATION

According to Herbert Eichert, Baltimore (*Journal A. M. A.*, May 9, 1936), many cases of industrial poisoning with trichloroethylene have been reported, but there is only one recorded instance of a toxic syndrome following the prolonged therapeutic administration of the chemical. Two additional cases are presented. The symptoms observed were due to a disturbance of the central nervous system as manifested by mental confusion, disorientation, inability to concentrate, amnesia, aphasia, dysarthria, ataxia and analgesia without anesthesia of the area innervated by the trigeminal nerve. In view of these observations it seems likely that the original supposition is correct; namely, that the cases of industrial poisoning were due partly to adventitious substances and that all the manifestations noted in the industrial cases of so-called trichloroethylene poisoning were not necessarily effects of trichloroethylene alone. Although proprietary preparations of trichloroethylene are thought to be relatively harmless remedies if used in prescribed amounts, the cases presented here indicate that this therapeutic agent is capable of producing grave states of intoxication if the suggested dosage is exceeded or if the administration of the drug is unduly prolonged.

THE THYMUS AND PINEAL GLANDS

Extracts of the thymus produce a surprising increase in early maturity and body growth in white rats. This is more marked when the treatment is continued for several generations.

Pineal extracts cause slow body growth (dwarfs), with precocious sexual maturity.—Dr. Leonard G. Rowntree, Philadelphia, Pa.

Marriages

David William Fey to Miss Wilma Buehler, both of Peoria, Ill., June 20.

Joseph Howard Siegfried to Miss Mary Elizabeth Easton, both of Peoria, Ill., August 7.

Personals

Dr. Henry Schmitz, Chicago, addressed the Kankakee County Medical Society in Kankakee, September 10, on carcinoma of the cervix.

Dr. Margarete M. H. Kunde, Chicago, addressed the Iroquois County Medical Society in Watseka, September 24, on endocrine therapy.

Dr. Lee O. Frech, Decatur, addressed the Randolph County Medical Society, August 27, on medical economics.

Dr. Ford K. Hick, Chicago, will address the Bureau County Medical Society, September 8, on pneumonia.

At a meeting of the Lee County Medical Society, September 7, Dr. Howard L. Beye, Iowa City, spoke on management of acute conditions in the abdomen.

Dr. Charles H. P. G. Benning, district health officer of Royal Oak, Mich., has been named school health director of Peoria.

Dr. Hal E. Freeman, Willard, Mo., has been appointed a member of the student health service, University of Illinois, Urbana.

Dr. Rosco G. Leland, Chicago, addressed the Sangamon County Medical Society in Springfield, September 3, on "The Economics and Ethics of Medicine."

Dr. Raymond W. McNealy, Chicago, discussed cancer of the breast before the Peoria City Medical Society, September 15.

Dr. Franklin E. Walton, St. Louis, spoke before the Vermilion County Medical Society, September 1, on "Diagnosis and Management of Biliary Tract Diseases."

Dr. Philip McGinnis has been appointed health officer of Joliet township, succeeding Dr. Londus Brannon, who resigned after three years' service.

Dr. William B. Serbin, Chicago, addressed the Coles-Cumberland County Medical Society, September 10, on "Toxemias of Pregnancy."

Dr. Lowell D. Snort, Chicago, presented a paper before the Union County Medical Society, September 10, on "Diagnosis, Pathology and Advancements in the Treatment of Duodenal and Gastric Ulcers."

At a meeting of the Adams County Medical Society in Quincy, September 14, Drs. Richard S. Weiss and Duff S. Allen, St. Louis, discussed drug eruptions and recent developments in surgery of the thyroid, respectively.

Drs. William B. Serbin and Laurence E. Hines, Chicago, addressed the McHenry County Medical Society, August 26, on "Pathology and Treatement of Procidentia of the Uterus" and "Present Knowledge of Endocardial Infections", respectively.

Dr. Maximilian J. Hubeny has been appointed chief of the x-ray department of Cook County Hospital, succeeding Dr. Chester H. Warfield, who has held the position for eight years.

The McLean County Medical Society was addressed, September 10, by Drs. Gladys R. H. Dick, Evanston, on scarlet fever; Rosco G. Leland, director, Bureau of Medical Economics, American Medical Association, economics and the ethics of medicine, and William H. Holmes, Chicago, clinical aspects of nephritis.

At a meeting of the St. Clair County Medical Society in Belleville, September 2, Dr. Vincil Rogers Deakin, St. Louis, spoke on "Pyelitis of Pregnancy." Dr. Frank G. Norbury, Jacksonville, addressed the East St. Louis meeting, September 3, on "Neuropsychiatry in General Practice."

Dr. Clarence J. McMullin addressed the DuPage County Medical Society, September 16, 1936, on "Complications of Diabetes Mellitus."

News Notes

—Dr. William F. Braasch, Rochester, Minnesota, will deliver the Eighth Annual William T. Belfield Lecture on Thursday, October 29, 1936, at the Palmer House. His subject will be "Unilateral Chronic Pyelonephritis." Preceding the lecture at 6:30 P. M. there will be a dinner in honor of Dr. Braasch to which members and non-members of the Society are invited (per plate $1.50).

—On June 15, 1936, the physicians employed by the Department of Public Welfare, State of Illinois, organized and formed the Physicians' Association, Dept. of Public Welfare, State of Illinois. At the subsequent general meeting held at Peoria, on Sept. 16, Dr. J. J. Madden of Kankakee, Illinois, was elected president and Dr. J. Marcovitch of Jacksonville, Illinois, was elected secretary-treasurer.

The main objective of the association is the betterment of the medical service in the various state institutions.

Opening for Physician:

—An unopposed practice in the best farming community in Iowa. Established 35 years, retiring. Modern town of 500 pop., modern home which would make an ideal community of maternity hospital. Five-room office with contents, introduction, R.R. and insurance appointments, immediate possession to purchaser; terms, cash necessary $4,500.00. Act quick, investigate thoroughly; opportunity of a life-time.

ZYX c/o Illinois Medical Journal,
6221 Kenmore Ave., Chicago.

—The state department of public welfare has announced a plan to promote better hygienic care for prospective mothers and infants. Ef-

forts will at first be concentrated in ten counties of the state showing the highest maternal and infant mortality rates and for which statistical material has been assembled for eight years: Richland, Pulaski, Alexander, Coles, Crawford, Montgomery, Morgan, Saline, Boone and Effingham.

—The Seventh Annual Charles Sumner Bacon Lectures will be given at the College of Medicine, University of Illinois, 1853 West Polk Street, in Room 423, by Dr. Frank W. Lynch, Professor and Head of the Department of Obstetrics and Gynecology, College of Medicine, University of California. The first lecture will be given Friday, October 16, at 5 p. m. on the subject of "Carcinoma of the Uterus." The second lecture will be given on Friday, October 23, 5 p. m. on the subject of "Uterine Fibroids." You are cordially invited to attend.

—Physicians of western Illinois will be guests of the McDonough County Medical Society at a clinical conference in Macomb, September 24. Dr. Robert S. Berghoff, Chicago, will conduct a heart clinic in the afternoon, and ten patients will be presented by local physicians for examination and demonstration. In addition, Dr. Berghoff will speak on common diseases of the heart; Dr. Joseph E. F. Laibe, Chicago, on hematuria, and Dr. William J. Pickett, Chicago, thyroid surgery.

—The Rockefeller Foundation has granted to the University of Illinois College of Medicine a fund of $15,000 a year for three years to promote undergraduate instruction in psychiatry. The work is under the immediate supervision of Dr. Harold Douglas Singer, professor and head of the department of psychiatry, and was begun September 1. In general, the program involves the extension of psychiatric teaching into other departments of medicine, particularly that of internal medicine.

—Totals of 150,462 cases of syphilis and 176,094 of gonorrhea were reported in Illinois during the ten years ended with 1935, according to the state department of health. During the same period, 1,232,746 births were recorded, indicating that about one in every eight or nine children is destined to be infected with syphilis at some time during life unless the sources of infection are cleared up. In 1935 a total of 15,628 cases was reported against 12,577 in 1926, with 12,988 and 19,813 as minimum and maximum figures for intermediate years, the department stated.

—The state health department reports that diabetes is now a hazard twice as great as that of tuberculosis for the population in one half of the cities and in one-third of the counties of Illinois. Deaths from diabetes have more than tripled during the last twenty-five years, the report stated, while those from tuberculosis have been cut in half. Last year, diabetes caused nearly twice as many deaths as did tuberculosis in twenty-five principal cities and thirty-four counties of the state. There were 1,978 deaths attributed to diabetes in Illinois last year against 600 in 1910 and 342 in 1902, the health department reported.

—The cancer research committee of the Chicago Woman's Club announces its annual lectures on cancer, with the following speakers:

Dr. Max Cutler, October 22, Cause and Cure of Cancer.

Dr. Harold E. Robertson, October 29, Rochester, Minn., Scientific Aspects of Cancer.

Dr. Frank L. Rector, Evanston, November 5, Cancer, A Public Health Problem.

Miss Edna Foley, superintendent, Visiting Nurse Association, Nursing Care of Cancer Patients in Chicago.

Dr. William W. Bauer, director, Bureau of Health and Public Instruction, American Medical Association, November 12, Importance of Popular Education on Cancer and Approved Methods of Carrying on Such Education.

—A three story addition to the Surgical Institute for Children, University of Illinois College of Medicine, is now under construction. The basement will contain an all tile hydrotherapy pool. On the first floor there will be a solarium, which will accommodate twenty patients at one time for ultraviolet treatments, and a gymnasium and apparatus room completely equipped for corrective exercises. Occupational therapy, recreation, case and general duty rooms will occupy the second floor, while the third will be given over to a complete laboratory, including fume and dark rooms, and two large school rooms with adjustable desks for the children. The present building is undergoing minor alterations on various floors which will increase its capacity about sixty beds, making a total of 144 beds to be occupied by indigent crippled children from all parts of the state.

Deaths

JOSEPH BARNES BACON, Macomb, Ill.; Texas Medical College and Hospital Galveston, 1879; Chicago Medical College, 1881; member of the Illinois State Medical Society; fellow of the American College of Surgeons; at one time instructor in surgery at the Northwestern University Medical School, Chicago; for many years surgeon for the Burlington Railway; formerly on the staff of St. Francis Hospital; aged 82; died, July 21, of carcinoma of the rectum.

LESLIE ALVEY BEARD, Polo, Ill.; Chicago Medical College, 1889; aged 76; died, June 26, of heart disease.

GEORGE WASHINGTON BAMBERGER, Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; aged 56; died, July 9, in the Michael Reese Hospital, of carcinoma of the stomach.

EMANUEL BERNARD FINK, Chicago; Rush Medical College, Chicago, 1920; a Fellow, A. M. A.; professor of pathology and bacteriology at the Chicago College of Dental Surgery; on the staff of the Cook County Hospital; aged 46; hanged himself, June 16.

NATHANIEL FRUTKOW, Chicago; University of Kansas School of Medicine, Kansas City, Kan., 1914; a Fellow, A. M. A.; aged 46; member of the staff of the Henrotin Hospital, where he died, July 20, of streptococcic meningitis.

CHARLES NEWTON GARTIN, Chicago; Bennett Medical College, Chicago, 1912; a Fellow, A. M. A.; aged 46; was drowned while swimming in Lake Michigan at Gary, Ind., June 14.

JACOB FRANCIS HAHN, Donnellson, Ill.; University of Illinois College of Medicine, Chicago, 1936; aged 31; died, June 13.

JACOB LA PORTE, Chicago; Illinois Medical College, Chicago, 1907; a Fellow, A. M. A.; aged 55; died, August 22, in the Edgewater Hospital, of cerebral hemorrhage and hypertension.

ALOYSIUS JAMES LARKIN, Chicago; Rush Medical College, Chicago, 1016; a Fellow, A. M. A.; associate in radiology at Northwestern University Medical School; aged 47; author of a book called "Radium in General Practice"; at various times on the staffs of St. Francis Hospital, Evanston, Ill., University, Cook County, Evangelical, Edgewater and Wesley Memorial hospitals, where he died, August 20, of coronary occlusion.

MAYER HARRIS LEBENSOHN, Chicago; Hahnemann Medical College and Hospital, Chicago, 1895; a Fellow, A. M. A.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1903; formerly vice president and counselor of the Chicago Ophthalmological Society; instructor in ophthalmolgoy at the University of Illinois College of Medicine, Chicago, from 1907 to 1914; for many years attending ophthalmologist to the Illinois Charitable Eye and Ear Infirmary, Mount Sinai Hospital, Orthodox Jewish Home for the Aged, and the Marks Nathan Jewish Orphan Home; aged 71; died, June 26, at the Mayo Clinic, Rochester, Minn., of embolism following a minor surgical operation.

SHERMAN T. LEWIS, Menard, Ill.; Northwestern University Medical School, Chicago, 1892; aged 69; died, June 20, or cerebral arteriosclerosis.

WILLIAM ALBERT O'CONNOR, Chicago; University of Illinois College of Medicine, Chicago, 1914; served during the World War; aged 50; died, June 25, in the Wesley Memorial Hospital, of hypertensive heart disease.

FRANCIS JOSEPH PFEFFER, Quincy, Ill.; Washington University School of Medicine, St. Louis, 1895; served during the World War; aged 63; died, June 16, in the Veterans Administration Facility, Jefferson Barracks, Mo., of myocarditis and coronary thrombosis.

VAN LEAR POLK, Chicago; Meharry Medical College, Nashville, Tenn., 1919; aged 43; died, June 26, in Proviso Township, of carcinoma of the tongue.

ANTON RADESINSKY, Chicago; Medizinische Fakultät der Universität Wien, Austria, 1894; aged 69; died, June 18, of cerebral thrombosis.

HERMAN REINSCH, Chicago; Chicago College of Medicine and Surgery, 1912; a Fellow, A. M. A.; fellow of the American College of Surgeons; served during the World War; aged 48; member of the staff of St. Francis Hospital, Evanston, where he died, June 14, of coronary thrombosis, while visiting patients.

WILLIAM LORENZO SHANK, Lee, Ill.; Central College of Physicians and Surgeons, Indianapolis, 1894; aged 69; died, June 1, in the East Side Hospital, Waterman, of coronary thrombosis.

HARRY ALBERT SINGER, Chicago; Rush Medical College, Chicago, 1922; a Fellow, A. M. A.; associate professor of medicine, University of Illinois College of Medicine; member of the Central Society for Clinical Research; on the staffs of the Cook County Hospital, University Hospital and the Research and Educational Hospital, University of Illinois; aged 40; died, August 21, of hypertension and acute pericarditis.

ORA F. THOMAS, Chillicothe, Ill.; Chicago Medical College, 1878; aged 81, died, May 27, of cholelithiasis and chronic pancreatitis.

GEORGE ABRAHAM TORRISON, Chicago; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1889; member of the Illinois State Medical Society; associate clinical professor of laryngology and otology, Rush Medical College; fellow of the American College of Surgeons; aged 71; attending laryngologist to the Lutheran Deaconess Home and Hospital and Lutheran Memorial Hospital; assistant attending laryngologist to the Presbyterian Hospital, where he died, June 20, of pulmonary tuberculosis.

PAUL W. WADSWOTH, Milan, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1883; formerly mayor of Milan; aged 76; died, May 27, of carcinoma of the face.

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